News Magazine of the American Standards Association, Incorporated

Marginal Notes

An Opportunity of a Century—

One of the greatest engineering shows ever produced is going on in Chicago this Fall. The Centennial of Engineering, it is called, and it celebrates the beginning, 100 years ago, of the engineering societies as we know them today. The amazing contributions the profession has made to civilization during the past 100 years will be on display. The program will illustrate the Centennial's slogan "Human Well-Being Through Engineered Progress."

The American Standards Association is proud to make it possible for ASA Members to have a part in this great celebration. (See program of National Standardization Conference, page 249.) The National Standardization Conference this year will be a part of the convocation of national and international engineering societies which is starting September 3. The convocation program will feature the contributions these organizations are making to the development of the United States and the advancement of civilization. A Symposium on "The Role of the Organized Professional" leads off (Sept 3), with the first engineering societies heading the program. Following will be symposia on education and training (Sept 4), food (Sept 5); tools (Sept 5); transportation (Sept 8, 9); National Standardization Conference (Sept 8, 9, 10); mineral industries (Sept 8, 9); structures and construction (Sept 8); chemical industries (Sept 9); communications (Sept 11, 12); energy (Sept 11, 12); health and human engineering (Sept 11); urbanization (Sept 12).

A Bow to Our Authors—

We are indebted for our feature articles on surface roughness specimens to a number of committee members who spent many hours helping to develop American Standards on surface finish. J. A. Broadston, who sent in the information on "The 'Why' of Surface Roughness Specimens," (page 230) called at ASA

offices during a visit to New York from Hollywood, California, to discuss the problem. Mr Broadston has a full-time job with the Aero-physics Laboratory of North American Aviation, Inc, Los Angeles. In his spare time, he is owner and manager of the Surface Checking Gage Company, makers of the plastic surface roughness specimens that he developed. He is a member of Subcommittee 1 on Surface Roughness Specimens of Sectional Committee B46.

D. E. Williamson, who is responsible for the practical discussion on how to use surface roughness specimens (page 235), is Associate Director of Research, Research Division, Baird Associates, Inc, Cambridge, Mass. He suggested and prepared the amusing cartoons illustrating how comparison specimens can be used in any company's operations. Baird Associates is one of the companies that makes Surface Roughness Comparison Specimens and Mr Williamson is a member of the B46 Subcommittee 1. We owe to him many of the suggestions that resulted in this triple feature.

C. R. Lewis, another member of Subcommittee 1, was closely affiliated with the development of the precision specimens described in his article (page 238). He is a Research Engineer in the Engineering Division of the Chrysler Corporation, where these precision specimens for calibration purposes were developed.

OUR FRONT COVER

The Museum of Science and Industry, Chicago, is the site of the National Standardization Conference during the great Centennial of Engineering. Its exhibits will be one of the high points of the meetings.

Opinions expressed by authors in STANDARDIZATION *are not necessarily those of the American Standards Association.*

Standardization

Formerly Industrial Standardization

ASA

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Featured

News

American Standards Activities

Standardization is dynamic, not static. It means not to stand still, but to move forward together.

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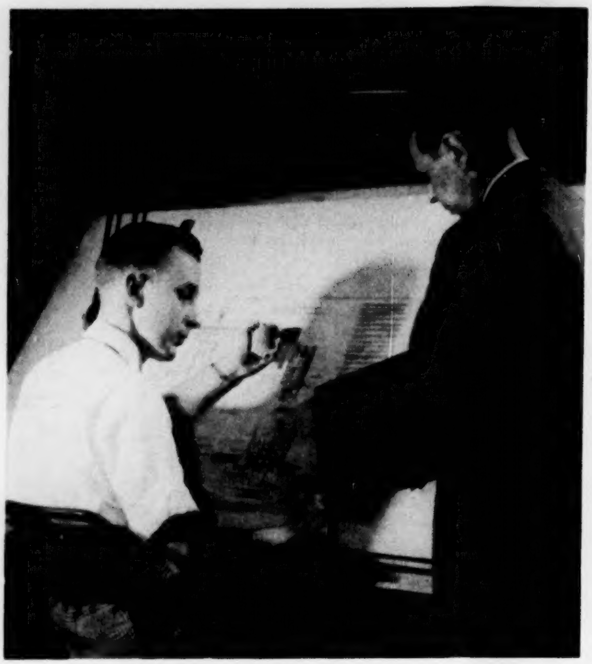
HOW TO CHECK SURFACE



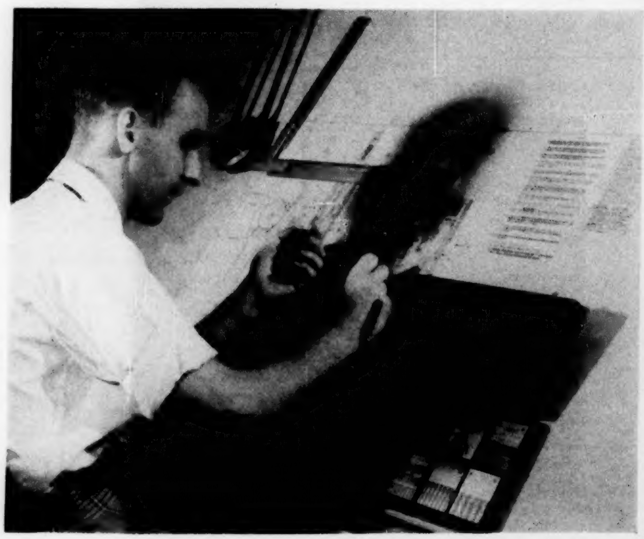
From designer to inspector, standard roughness specimens can help produce the right surface for each job. Here, the designer (right) specifies the maximum allowable roughness by use of a symbol corresponding to a finish on the roughness specimen.

they speak the same language

THE quality of the finish on a machined surface may determine whether the work turned out is satisfactory; it may be the determining factor in whether a machine operates smoothly; or it may be the cause of inefficiency and costly repairs. When a high-quality finish is needed, economy demands that the machined part meet the specifications; conversely, it is uneconomic to spend time and money in providing a high finish for a part which can do very well with a less highly finished surface.

To help the designer, the draftsman, the machinist, and the inspector in selecting and producing just the right surface for the job, a recently approved American standard now has made available standard recommendations for sets of flat roughness specimens of commonly used machined surfaces. This is the first time such recommendations have been agreed upon and published on a nationwide basis.

Specimens meeting the requirements of the standard are already available. A number have been in



The draftsman selects the designer's symbol on his specimens and indicates the exact finish without guesswork or rechecking.

These photos courtesy General Electric Corp.

QUALITY OF FINISH

The machinist checks the finish on the job with the surface roughness specimen to be sure it meets the specification.

use for some time; in at least one case, announcement of its production was made after approval of the standard.

The new American Standard, Physical Specimens of Surface Roughness and Lay, B46.2-1952, consists of two parts.

Part I describes precision specimens for use only in the calibration of roughness measuring instruments. The article by C. R. Lewis, "The 'Gold Standard' Precision Specimens of Surface Roughness," (page 238) tells about roughness specimens that meet these requirements.

Part II ". . . gives specifications for surface finish specimens intended to illustrate commonly used machined surfaces. . . ." In his article, "The Use of Standard Roughness Comparison Specimens," (page 235), Donald E. Williamson tells how these requirements and existing specimen blocks can help improve production with greater economy.

For a discussion of the meaning of the surface finish standards and the technical requirements see the following article by J. A. Broadston.

on surface roughness . . .

As a final check, the inspector refers to the surface roughness specimen to catch defective or unsatisfactory work.

The "Why" of the Surface Finish Standards

by James A. Broadston
Surface Checking Gage Company

IN the early days of metal processing, the making of a machine was accomplished by one or a few skilled craftsmen working together. Under these conditions, neither close dimensions, tolerances, nor finish designations were necessary as each craftsman drew upon his personal experience for these requirements. When the foundry became a separate enterprise, the finish symbol *f* was adopted to show the patternmaker, foundryman, and machinist that the surface so marked was to be "finished," hence additional material should be allowed for finishing.

Advancing techniques soon required that a coded symbol, such as *f* 3 be used on drawings to indicate that, for example, a "smooth machine finish" was required. These brief descriptions (based strictly on personal opinion rather than upon actual measurement and therefore subject to wide variations in interpretation) were soon supplanted by similarly coded symbols designating that certain processes be used (such as "smooth grind") as it became known that some processes produce smoother finishes than others. Even with this improved control, parts were often produced with unsatisfactory finishes, as acceptance was a matter of opinion rather than measurement. Now that surfaces approaching perfection can be rapidly produced within unbelievably close dimensional tolerances, mechanisms are designed that depend upon the precise control of these factors for their successful operation. The old surface finish designations and the loose descriptive controls they connote have therefore become inadequate.

In 1947 an American Standard (ASA B46.1) entitled "Surface Roughness, Waviness and Lay," sponsored by the American Society of Mechanical Engineers and the Society of Automotive Engineers, was approved by the American Standards Association. This standard established an approved series of values expressed in microinches (millionths of an inch, 0.000001) for designating the relative size of the minute geometrical irregularities existing on the surfaces of solid materials. These values, dividing the normal range of the irregularities of machined surfaces into convenient steps, serve as an index to their size when used with an approved new symbol (Fig. 1). The American Standard does not specify the surface finish suitable for any particular application nor the means by which it may be produced or measured. Neither is the Standard concerned with other surface qualities such as appearance, luster, color, hardness, microstructure, or corrosion and wear resistance, any of which may be governing design considerations in specific applications.

In general, all surfaces of solid materials, particularly those prepared by machining, are composed of a series of more or less microscopic peaks and valleys. These irregularities have a vital influence on the wear, strength, dependability, and performance of parts, hence their control through proper designation is definitely a design function. Although both the shape and length of the irregularities may affect the performance of a given surface, the American Standard deals only with indices for controlling their height, width, and direction. Fortunately for the designer, surfaces normally produced by a given process have irregularities whose shapes and general characteristics are similar, hence it is possible to control the performance of a given surface within very close limits by controlling only the average size of the surface irregularities.

The measurement and designation of roughness is the most important factor considered by the American Standards and serves as the prime index to the magnitude of the surface irregularities.

The term *roughness* refers only to relatively finely spaced surface irregularities such as those produced on machined surfaces by the cutting action of tool edges or abrasive grains. The maximum allowable roughness height index expressed in microinches (the approved unit for surface roughness measurement) is normally specified by the use of the approved symbol (Fig. 1) and one value from the approved standard series (Table 1).

Table 1
Standard Roughness Height Values (Microinches)

¼	**4**	13	40	**125**	400
½	5	**16**	50	160	**500**
1	6	20	**63**	200	600
2	**8**	25	80	**250**	800
3	10	**32**	100	320	1000

Any lesser height is satisfactory except that when two values are given, i.e., 32-8, they indicate maximum and minimum allowables. It is recommended that the bold faced values be used because the majority of the commercial standards for surface finish designations give preference to them, and American Standard B46.2-1952 on "Physical Specimens of Surface Roughness and Lay" establishes physical specimens conforming to these values.

The standard also permits the maximum allowable roughness width (repetitive units of the dominant surface pattern due to feed) to be specified in inches (adjacent to the lay symbol) as shown, Fig. 1. Roughness height specifications are based on irregularities having widths up to and including the maximum specified, or, when not specified, up to and including the irregularities from machine feed.

The term *lay* refers to the direction of the predominant visible surface marks or irregularities. A series of symbols is approved by American Standard B46.1-1947 for use in

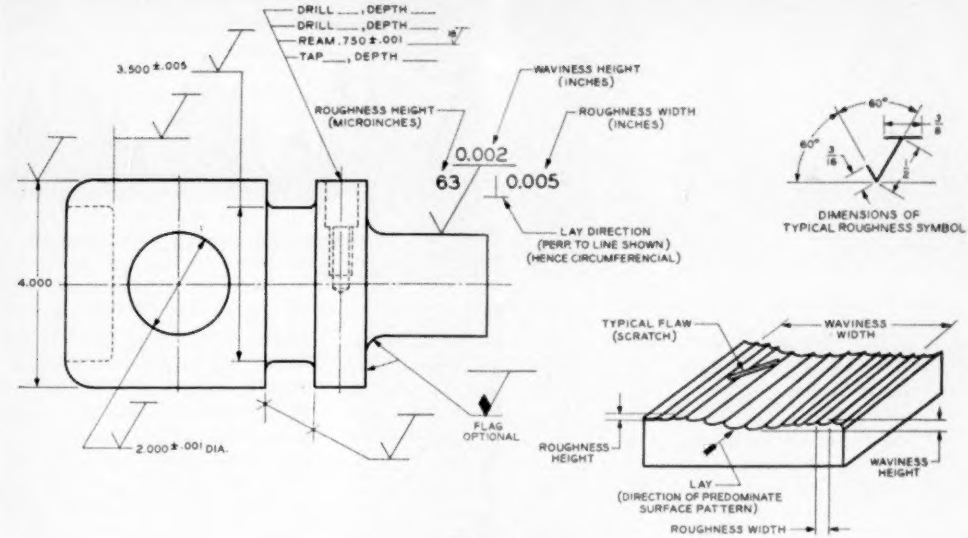


Figure 1
A typical application of the surface roughness symbol

conjunction with the approved surface roughness symbol to indicate the desired lay direction with respect to the boundary line of the surface shown with the symbol.

The American Standards, while satisfactory for defining certain descriptive terms, establishing an approved nomenclature, and creating (B46.2-1952) a duplicable standard set of blocks, are not yet quite suitable (B46.1-1947) for use as a simple drawing reference because they are not definite enough in themselves. The National Aircraft Standards Committee, made up of representatives of the major aircraft manufacturers of the United States, has prepared a drawing reference standard titled "NAS 30 Surface Roughness Designation." Although it originally followed a 1, 2, 5, 10, 20, 40, 100, 250, 500 rms microinch series, it was revised in December 1948 to follow the American Standard B46 preferred arithmetical average series of 1, 2, 4, 8, 16, 32, 63, 125, 250, 500, 1000, and 2000 microinches.

Because surface irregularities are so minute, so variable, and so complex, it is impossible to use a single simple directly measured roughness height as an index to the performance or over-all roughness of a surface. The standard roughness value must therefore necessarily be a weighted average of some sort expressed in microinches (0.000001 in.). The current American Standard B46.1-1947 recognizes that this index value may be one of several that will serve to indicate the approximate average size or magnitude of the surface irregularities.

The standard roughness index values may be described and defined thus:

If a cross-section of a given surface were highly magnified, the contour or profile of the surface irregularities might look like Figure 2.

For such a simple, regular profile where all the peaks and valleys are relatively uniform, the *Peak-to-Valley Height* roughness index is merely the distance between these elevations, expressed in microinches. For a highly irregular surface profile (see Figure 3) it is customary to use one of two interpretations:

(1) *Maximum Peak-to-Valley Height* —the vertical distance between the elevation of the highest peak and that of the lowest valley, or (2) *the Average Peak-to-Valley Height*—the vertical distance, expressed in microinches, between the average elevation of the peaks and the average elevation of the valleys. By their definition it is plainly evident that these two approved roughness index values depend either upon the chance of

Figure 2
A simple profile of surface irregularities, highly magnified

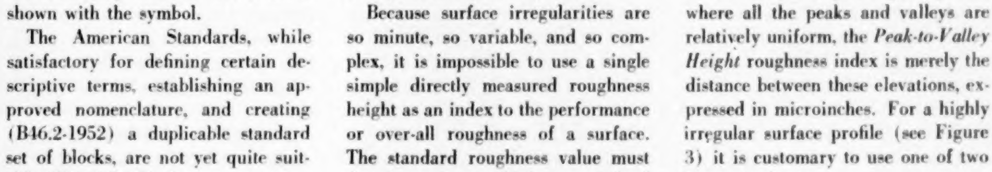
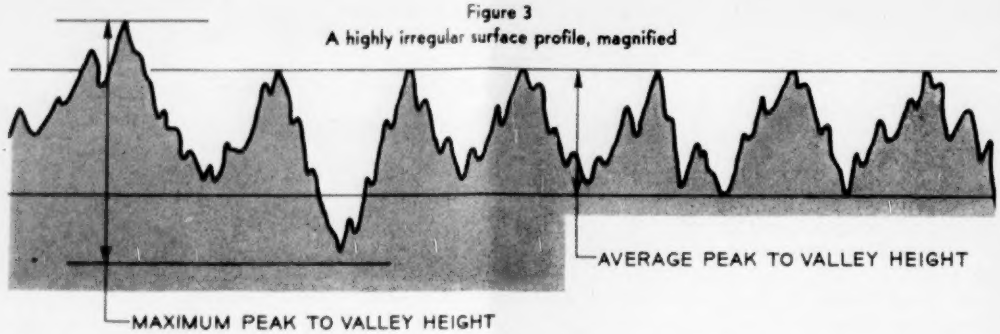


Figure 3
A highly irregular surface profile, magnified



finding the highest peak and lowest valley on a given surface or upon either human or mechanical ability to estimate their average heights, hence can hardly be classified as specific or duplicable measurements. Further, they make no allowance for the fact that every profile of a given surface will differ, nor do they allow for variations in the shape of irregularities, which may have a vital influence on performance.

Approved roughness height ratings may also be expressed as an *average deviation from the mean surface*. The "mean surface" referred to is a surface located in such a way that the volume of the material in the peaks above it is equal to the volume of the valleys below. It is the perfect geometric surface that would be formed if all the peaks were leveled off to the point where the material removed would just fill the valleys. The *arithmetical average* deviation of the surface of the irregularities from the mean surface may be defined as the result of taking a great many closely spaced measurements in microinches, such as a, b, c, d, e, etc. (Figure 4), and averaging them. If each value is squared and the square root of the average square is taken the result will represent the *root-mean-square* average. These two averages are not strictly equivalent mathematically, but general agreement exists that the difference between them is negligible for surface roughness measurement. These averages make some allowance for the shape of the irregularities as well as their height, hence, have been selected as suitable indices for surface roughness measurement pending determination of better comparative indices that lend themselves to rapid and effective measurement.

The *arithmetical average* deviation from the mean is rapidly becoming the most universally used value for designating surface roughness, and it is expected that the next edition of American Standard B46.1-1947 will specify it. It is used abroad, the British *centre-line average* being synonymous, and is gaining favor in this country. Commercial surface roughness measuring instruments are calibrated for both the arithmetical and rms values. The American Standard B46.2 roughness samples use it exclusively because it is simple to define and explain and because it serves the purpose as well as any other value selected to date.

The closest commercial approach to actual roughness measurement is made by tracer-point instruments such as the Surfindicator, the Profilometer, and Brush Surface Analyzer. These precision instruments interpret the up-and-down motion of a finely pointed diamond as it is slowly drawn over the irregularities of the surface.

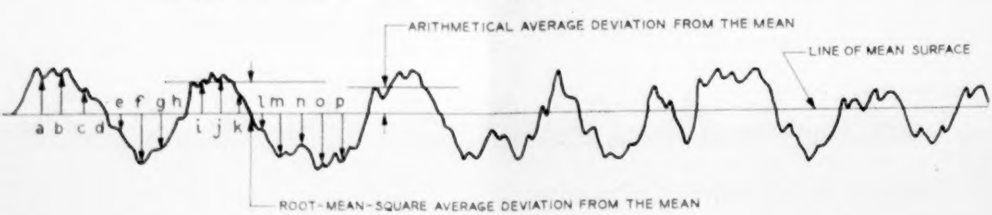
The Surfindicator and Profilometer, which indicate the average (arithmetic and rms, respectively) deviation from the mean surface values directly on a meter, provide an excellent method for making rapid roughness comparisons of finely finished critical surfaces.

The Brush Surface Analyzer makes a greatly magnified record on a moving paper tape of the irregular motion of the diamond tracer point. This permanent record depicts an approximate contour of the irregularities being traced.

The British-made Tomlinson, Topograph and Talysurf should also be included among currently available surface-profile measuring and recording instruments.

All roughness-measuring instruments have inaccuracies and inherent range limitations, hence readings should not always be accepted at face value. They require intelligent interpretation based on a knowledge of the shape of the surface irregularities, the probable performance of the

Figure 4
Closely spaced measurements are used in calculating arithmetical average deviation



surface and allowances for the characteristics of the instrument used for measurement.

A reliable laboratory method for determining the surface contour of a machined surface is to plate it with a hard, thick, closely adherent layer of nickel and to taper section it by grinding and polishing a plane section through it at a very small angle to the plane of the nominal surface. The nickel plate supports the surface irregularities during the taper sectioning procedure and permits the line of separation between base metal and nickel to be accentuated through etching of the base metal or heat coloring. Photomicrographs of the area where the two metals meet in the taper section permit accurate measurements of surface contour to be made, thereby providing a means of checking the accuracy of stylus instruments.

Taper sectioning has its limitations. Experience has shown that the resolving power of microscope optical systems will not permit accurate determinations of roughness to be made on surfaces whose peak-to-valley heights are less than 10 microinches. Taper sectioning also destroys the part so that the method is not suitable for production determinations. As considerable time and equipment is required, it is a laboratory process.

While measurement of surface roughness is a complicated procedure requiring precision instruments as well as a completely equipped laboratory in some cases, the comparison of most machined surfaces with similarly finished standards of known roughness is relatively simple. If the fingernail is held in a scratching position against a standard surface roughness sample, then drawn over it (across the lay, if any) a sensation of roughness will be experienced. By drawing the same fingernail over a piece of work prepared by the same process, it is usually easy for even inexperienced personnel to determine which of the two is the rougher unless their roughness is so nearly alike that the difference is negligible. It is surprising how small a difference in roughness can be detected. This sensitivity can best be proved

[illegible]

by selecting at random a half-dozen pieces of different types of paper, i.e., wrapping paper, newsprint, coated book, letter paper, etc. Even the inexperienced can agree upon arranging them in order by roughness, yet they will differ in roughness by only a few microinches.

The surface quality of most ordinary machined parts can be controlled in the same simple way through the extensive distribution of accepted roughness standards, which will permit the direct comparison of surfaces being prepared with the limiting values of roughness designated on the drawing by the designer.

Roughness standards for direct fingernail comparison are commercially available in many forms. Some are blocks, some are bar samples, some are original machined surfaces, some are plated replicas and some are molded of a hard black phenolic plastic. As roughness comparison is essentially a tactual rather than a visual procedure, and as the idea that a brighter surface is necessarily the smoother is false, the material of which the standard is made need not be the same as the material being processed as long as certain precautions are taken. When a fingernail tactual comparison between dissimilar materials is made, it is preferable that the eyes be closed so the sense of feel is intensified and is used exclusively as a guide. Otherwise, differences in hue of the metal, luster, reflection, color, condition, etc, can be very misleading. As long as the surfaces of the standard specimens are durable, corrosion-resistant, and typical of machined surfaces prepared by the same process, no difficulties should be experienced. When any doubt exists, particularly on fine finishes, the use of stylus instruments is recommended.

The surface finish specimens specified in Part II of American Standard B46.2-1952 are for use where visual and tactual comparisons of commonly used machined surfaces are adequate. These specimens embrace a range of roughness values and machining methods. Twenty-six specimens have nine roughness type values following the 2, 4, 8, 16, 32, 63, 125, 250, and 500 microinch progression. It is not the intention of the standard to prevent the manufacture or use of other reference specimens which may differ from those described in shape, type of process, lay, roughness, width, or roughness height. These specimens are arranged in six groups, as shown in Table 2 (below).

Each specimen is to be identified by its numerical value of roughness height in terms of the arithmetical average deviation from the mean surface, and each is to be checked at a sufficient number of points to determine a representative average. Individual readings may not exceed the tolerances shown below for machined surface specimens.

Roughness Height Microinches	Tolerance Percent
2-4	+25 —35
8	+20 —30
16	+15 —25
32 and above	+15 —20

One objection to the use of surface roughness specimens that duplicate typical machine finishes has been the fact that such surfaces are not uniformly rough, i.e., roughness measurements taken in several areas on a given surface will not give identical readings because machined surfaces are inherently non-uniform. They are therefore poor as primary standards. Because such surfaces do not fall within the range of accuracy required of true primary standards, the General Motors-Chrysler Research Laboratories have developed an exceptionally accurate series of specimen blocks called "Geometric Surface Finish Standards." (See article on page 238.)

Although optimum tolerances and dimensional clearances for many applications have been specified in handbooks and design manuals for many years, the present state of the surface finish art (1952) is such that few precise surface roughness values based on the new standards are available. Designers can contribute to the future progress by (1) adopting the new standard designations and the finishes they connote, (2) determining by comparison and measurement the roughnesses of typical surface applications in their own fields that have given satisfactory performance, and (3) making this information available to others by publication.

Table 2
Classification of surface finish specimens according to application Data from ASA B46.2-1952, Part 2

Type of Machined Surface	Roughness Height (Microinches) (Arithmetical average deviation from the mean surface)	Roughness Width (Inches)
Honed, lapped, or polished	2 4 8	
Ground with periphery of wheel	4 8 16 32 63	
Ground with flat side of wheel	4 8 16 32 63	
Shaped or turned	32 63 125 250 500	0.002 0.005 0.010 0.020 0.030
Side milled, end milled, or profiled	63 125 250 500	0.010 0.020 0.100 0.100
Milled with periphery of cutter	63 125 250 500	0.050 0.075 0.125 0.250

The Use of Standard Roughness Comparison Specimens

by Donald E. Williamson

Associate Director of Research, Baird Associates, Inc.

THE measurement of surface roughness embraces all methods whereby the numerical roughness of a surface may be estimated, computed, or measured instrumentally. Standards of surface roughness (American Standard, Surface Roughness, Waviness, and Lay, B46.1-1947) leave a choice as to how roughness may be designated, and a complete freedom of choice of the method by which these numbers are determined. Two general methods of determining the roughness of a surface may be mentioned:

(1) Tactual comparison (by means of roughness comparison specimens).

(2) Instrumental measurement.

In general, instrumental measurement will be the more accurate and will be most useful in settling disputes. As is the case with all mechanical devices in the hands of human beings, however, roughness-measuring instruments may be subject to error due to either misuse or malfunction. Most errors due to misuse center around attempts to apply the instrument to measure types of roughness for which it was never intended and which really constitute special measuring problems. These limitations, however, are clearly set forth by the manufacturers of instruments and should cause little difficulty in routine work.

Roughness Comparison Specimens will, in general, be more useful than instrumental measuring devices and for certain purposes are the only possible answer to the need. An example of this is the use of roughness blocks by designers and draftsmen in order to determine reasonable roughness dimensions. It is almost impossible to carry such a program too far or to say too strongly that every machine-cut surface should have a specification not only of size but also of roughness. Draftsmen and designers should ordinarily specify the roughest surface which their conscience and experience will allow. Whenever possible, a surface which can be produced in a single operation should be designated. This will frequently mean that a roughness designation, even for cut-off operations, will be used.

Original machine-cut Roughness Comparison Specimens are available (see page 236) and present the most realistic feel and appearance. The presence of "overhang," or the occasional re-entrant irregularity caused by rough snagging or milling operations lends a reality to appearance and feel not preserved in reproductions. However, these characteristics are frequently minor in importance and are not covered in roughness specifications nor measured by presently available roughness-measuring instruments. Replica blocks made of metal or plastic differ in both feel and appearance from the cut specimens. In general, the replicas feel smoother than the cut specimens of the same roughness height.

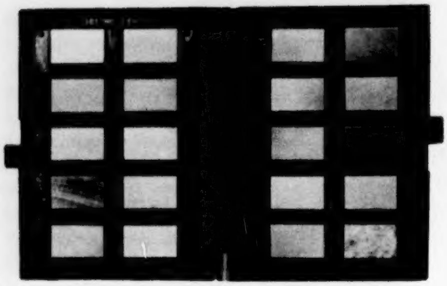
Design (see Figure 1)

It is unusual in these times to find a factory engaging in even medium production that does not recognize the importance of surface roughness control and that does not take some steps to specify and control at least a small percentage of its production. Much of this awareness was brought about by rather complete roughness specifications placed on machined parts during the Second World War. Components for aircraft engines and accessories were rather completely specified and due to the widespread system of subcontracting, even the smaller plants became familiar with this type of specification. As most of the impetus for this program filtered down from the government and prime-contractors, it was unusual for even moderately sized operations to give serious thought to the ways in which roughness control could be of economic importance to themselves. Even since the war the true economic value of roughness control seems to have been missed in a large number of cases.

The first thing that should be realized is that it is nearly impossible to go too far in the specification of surface roughness. The reader finds himself in immediate disagreement with this statement; that is only natural. There is no sound logic that says that because a little of something is good a lot of it will be better. It consequently remains for us to examine the particular case of roughness control and attempt to arrive at the proper conclusions.

The beginning of a roughness specification must necessarily start with the original conception of the part under consideration. Roughness specification for a part may originate either through the educated guess of the designer or through the more accurate though more costly medium of a complete engineering test in which the part is fabricated with varying degrees of roughness and tested in actual operation. The designer or draftsman will have no use for instrumental measurement as he is not yet in possession of parts representing satisfactory production. The educated guess is based on experience with the particular class of equipment upon which he is exercising his talents. His most useful tool is a set of Roughness Comparison Specimens by means of which he can estimate the surface most likely to combine the qualities of ease of manufacture and satisfactory operation.

Where engineering tests are possible, either roughness specimens or a measuring instrument may be used,



An example of one of the commercially available machine-cut roughness comparison specimens

the measuring instrument having a considerable advantage due to its inherently greater accuracy and its ability to measure on surfaces whose contour may prevent tactual comparisons.

Roughness specification should not be restricted to surfaces engaged in metal-to-metal contact or operating as bearings. In the event that fatigue failure of a part is a factor, the importance of roughness control is undisputed. However, in those cases in which the surface is unstressed the usefulness of the roughness specification is entirely economic. The purpose in these cases is to specify that surface which can be produced most cheaply (that is, with a minimum number of operations) and still be satisfactory for its purpose. Thus it may be found that provided a cut-off saw is properly maintained and that blades of suitable quality are changed at intelligent intervals, the surface of the cut-off saw may either be satisfactory as a final finish or may be good enough to reduce the number of finishing operations subsequently required to complete the piece.

Set-up (see Figure 2)

The next most important person in the chain of events is the set-up man. This is one who understands the sequence of operations necessary to complete the part and appreciates the savings to be realized through the elimination of operations and the reduction in time necessary to complete any one operation. He will not only be familiar with the machines available to production, but will know how the various factors of hardness of material, speed, feed, tool conditions, grinding wheel characteristics, and coolants affect the dimension and roughness of each operation in turn. His job should be not only that of setting up a particular machine, but should also include that little bit of research that may be necessary to produce the largest number of parts per hour.

At this point a word of caution must be thrown in. The law of diminishing returns operates in the plant as it does everywhere else. If the job is a short run, it is obviously wasteful to spend several hours in setting up a job that will take only a day or two to run. On short-run jobs a set of roughness specimens may be all that is required to achieve the desired accuracy. On longer runs particularly those which may go on for several weeks or months, the quick research job should be done to find out what conditions of wheel feed, spark out, etc will get the required finish in the shortest time. The greatest source of unrealized wealth in the United States is in not spending time producing unnecessarily good finishes at an intermediate operation.

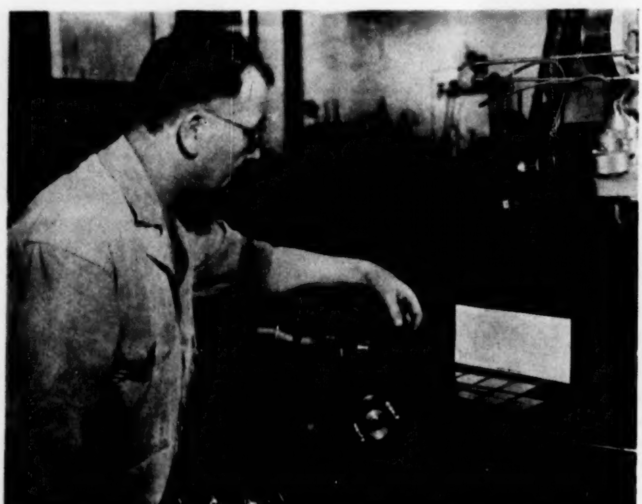
Production (see Figure 3)

During the production of the desired part the operator can either measure the roughness of the pieces by means of an instrument or can use Roughness Comparison Specimens. Rarely will it be economical to assign an expensive instrument to this job.

Bear in mind that production control of roughness is not merely for the purpose of satisfying the whims of an Engineering Department, nor is it purely for the purpose of getting production parts past inspection. The principal benefits are:

(1) It is most economical not to produce the parts that you are going to throw away, and

(2) At the end of the run you expect to have several hundreds or even thousands of parts finished that you never expected to make by the old hit-or-miss methods.



General Electric Co

Machinist uses roughness specimens to check finish on work in lathe

An additional benefit of close control when using complicated tooling is the possibility of operating wheels and tools to the limit before redressing or replacing in order to save unnecessary down time.

Thus the machine operator will rarely need an instrument but will usually be satisfactorily equipped if he has a set of Roughness Comparison Specimens or a production sample. The choice will depend on the production rate and the narrowness of the roughness tolerance. If it is possible to produce a large dollar volume of scrap in a comparatively short time, methods capable of closer control are called for.

Inspection (see Figure 4)

The amount of equipment called for in the inspection department will depend to a large extent on the production rate and the amount of subcontracting. When large amounts of material are subcontracted, it is usually necessary to protect oneself against disputes over the roughness value by having readily available an accurate instrumental means. Statistical quality control can be applied to measurement of roughness, making it unnecessary and even undesirable to measure each piece. Most of the work of the inspector, however, can be performed satisfactorily through the use of commercial Roughness Comparison Specimens which are not only cheaper at the outset but are faster to use and require no mechanical set-up. The only function of inspection should be to act as a check on production and to guard against the acceptance of inferior work from suppliers. The inspection department should be encouraged to report not only finishes rejected as being too rough to meet specifications but also those whose surfaces are a great deal better than that called for on the drawing. The recognition of surfaces better than required may be the first important clue to the reduction of cost. The inspector should be considered the helper and not the censor of production. Remember that, "It is impossible to inspect quality into a product which was not put there in production."

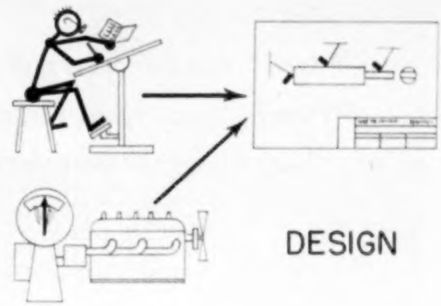


Figure 1

Roughness dimensions on drawings are determined by designer using roughness comparison specimens or by results of engineering tests

DESIGN

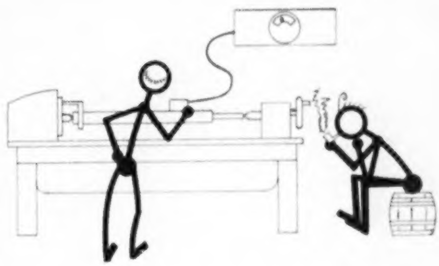


Figure 2

The most economical procedure for attaining the desired finish is determined at the start of production

SET-UP

Figure 3

The machine operator makes frequent checks of roughness to assure maximum tool life and to cut rejects

PRODUCTION

Figure 4

This important operation guards both plant and supplier against failure of production controls

INSPECTION

The "Gold Standard" Precision Specimens of Surface Roughness

by C. R. Lewis

Research Engineer, Chrysler Corporation

SURFACE finish has long been recognized as one of the variables that affect the functioning of machine parts. It is known to be important in the fields of friction, wear, lubrication, fatigue, and corrosion, both fretting and chemical. Attempts to specify and control surface finish were largely sporadic up to about 20 years ago, when a number of investigators attacked the problem. During this early work, a number of methods of designating surface finish were proposed, and it was found that the surface roughness, measured as the average deviation of an actual surface from an ideal surface of the same overall shape, was the simplest surface property which could be measured readily, and which gave good correlation with the behavior of the part in service.

Surface roughness, defined in this way, can be measured readily by moving a sharp, pointed stylus over the surface being investigated. The movements of the stylus perpendicular to the surface can be recorded electrically, and suitable running average values of the roughness displayed on a meter. Several instruments of this type have been made and are commercially available.

Since the linear dimensions involved in measuring surface roughness frequently are of the order of millionths of an inch (the wave length of yellow light is approximately 22 millionths of an inch) the problems of following the surface precisely with a mechanical system are severe, and instruments are necessarily subject to some variation, both from one instrument to another, and in any one instrument from time to time. Such variations have been found to be sufficiently extensive to affect surface finish control programs where measurements have to be made at widely varying times and places.

At the end of World War II, the automotive industry found itself in this situation, where the need for controlling surface roughness was evident, means for measuring surface roughness were available, but sufficient reproducibility in measurement had not been achieved to make a roughness control program effective for a number of widely scattered plants. Chrysler Corporation felt that the obvious solution to this problem would be a set of physical specimens of surface roughness, which could serve the same purpose for measurement of roughness as Johannsen blocks do for linear measurements. It was recognized that the production of such a set of specimens would be a major undertaking, and that their use must be widespread if they were to serve their intended purpose. Accordingly, a joint research project was set up between Chrysler Corporation and General Motors Corporation to make available a set of physical specimens of surface roughness of as high an order of precision as possible.

The design chosen for these precision surface finish specimens is such as to facilitate the use of presently available instruments for measuring surface roughness. The wide experience of Chrysler Corporation with superfinish has indicated that both reproducibility and uniformity of surfaces produced by conventional machining operations would be too poor to justify their use as precision roughness specimens. A type of surface was needed which could be represented by a simple mathematical description so that various types of roughness measurements and roughness measuring instruments could be used in conjunction with it with equal facility.

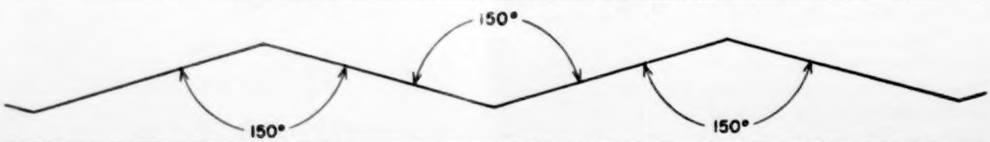
The surface profile finally adopted after some experimentation is shown in Figure 1. It consists of a series of planes inclined to each other at an angle of 150 degrees. The height of the profile is made at a series of definite values corresponding to the preferred roughness values approved by the American Standards Association.* The spacing is fixed by the profile height and the angle, and increases in direct proportion to the roughness.

The geometry of such a surface is simple and lends itself readily to a calculation of various types of specified average surface roughness which have been proposed or are in use. The spacing is such that no measurement errors are involved due to wave length limitations of any roughness measuring instrument now available. The wide groove angle allows deep

* American Standard on Surface Roughness, Waviness, and Lay, B46.1-1947.

Figure 1

Surface profile adopted by Chrysler for precision surface finish specimens



penetration of stylii commonly used in measuring instruments.

It was found after the initial surfaces of this type were produced that their appearance did not resemble that of any commonly used surface and that it was difficult to judge the roughness of the standard specimens by either appearance or feel, criteria which are in wide use for the approximate determination of roughness.

At the beginning of this project, plans were made to produce a series of 18 surfaces ranging in roughness from 5 microinches average deviation from the mean to 500 microinches. Of these 18 projected specimens, approximately half have been made. At the present time only five roughness values are available commercially, covering a roughness range from 20 to 125 microinches.

These specimens are used for the calibration of surface roughness measuring instruments. Their use will enable roughness measurements, taken at any time or place, to be compared directly with measurements taken at any other time or place and will put the field of surface finish control on a uniform and technically sound basis. They will not only ensure that all instruments are calibrated identically but will also show when a particular instrument departs from its initial calibration. With their aid the problems of specifying and controlling finishes on parts supplied by subcontractors and on parts supplied by more than one manufacturer will be greatly simplified, and the quality of assembled machines can be considerably improved.

The production of these specimens involved a solution of numerous unexpected problems. The first work done on the project involved the development of a machine capable of making the desired surfaces. Before this question was answered satisfactorily, it became necessary to find a suitable material on which to make the surface. Since the original surface would be much too scarce and costly for widespread use, a suitable method of duplicating had to be found and experience in its use built up. Although initial work of only a few months had indicated that the production of precision roughness specimens was feasible, it has taken over seven years before they could be available in sufficient number to be put on the commercial market.

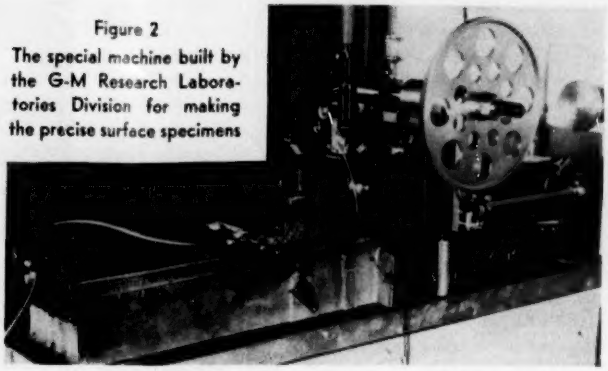


Figure 2
The special machine built by the G-M Research Laboratories Division for making the precise surface specimens

Although development of production methods, materials, and duplicating methods was carried on simultaneously, each function will be described separately.

When this project was first planned, a number of production methods were discussed, but the most suitable appeared to be the use of a ruling machine such as those employed for the manufacture of diffraction gratings. A number of test rulings were made on the ruling engine operated by the Physics Department of the University of Michigan which indicated that machines of this type would be capable of producing the desired surfaces.

After some experience had been gained in the use of this ruling machine, a specialized machine for this project was designed and built by the Research Laboratories Division of General Motors. This machine is shown in Figure 2. The ruling is done by a specially shaped diamond supported by a pivoted and counterweighted arm. The work is reciprocated under the diamond by a planer type movement, the reciprocating table being floated on oil. Ruling is done only during the advance stroke; a mechanism being provided to lift the diamond from the surface during the table return. During this return stroke, a lead screw is rotated by a magnetic indexing mechanism to advance the diamond into position for the next ruling stroke.

Since originally built, this machine has been modified extensively to improve its operation and at the present time gives very reliable and reproducible results. It is capable of ruling lines of pitches as fine as 10,000 to the inch and as coarse as 300 to the inch.

Since the desired number of lines per inch is determined by the angle and depth of the surface contour, it has been found necessary to provide three toothed wheels for lead screw indexing of 500, 419, and 268 teeth respectively. These three wheels enable rulings to be made of all the desired roughness values having pitch errors which exceed 10 microinches in only one case.

Recently, the original planer motion has been revised to give constant velocity between the diamond and the surface being ruled during the ruling stroke. A number of other detail modifications in the indexing mechanism, the diamond support, and the dash pot controlling the movement of the diamond support arm have been made to improve the performance of the machine.

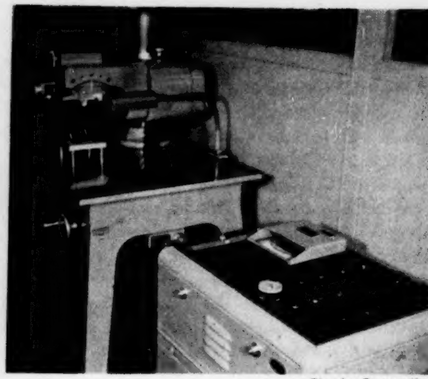
Some early experiments in ruling surfaces on steel and on nickel served to establish the requirements for a suitable material for this work. It was found that the ruling process did not remove any metal but rather embossed the lines in the material being ruled. To ensure uniform surface contour, a highly ductile material was required. The material had to be capable of taking a high polish

in order that all surface irregularities could be eliminated in preparation for ruling. These requirements are somewhat contradictory since highly ductile materials are generally difficult to polish. To satisfy the requirements of the duplicating process, the material chosen had to be chemically inert. It was also found that, since no material had been removed, the ruling diamond pushed up a ridge on either side of the line being ruled and that it was highly desirable that adjacent ridges should cold weld together under the pressure exerted by the diamond. In addition to these specific requirements, a high degree of homogeneity was necessary to ensure uniform ruling depth.

The only material which has been found suitable for this work is pure gold. The early work done on the project used an electroplated layer of gold which was hand polished to the desired degree of smoothness and flatness. It was found that, in spite of statements in metallurgical textbooks, gold is susceptible to cold working, so that the hand polishing operation introduced varying degrees of hardness over the surface of a single blank. With gold surfaces prepared in this way it was difficult to obtain uniform rulings. After a long series of experiments to try to improve this condition, it was finally discovered that gold rolled on a steel backing could be made sufficiently smooth and homogeneous to give high-quality surfaces.

The study of the problem of obtaining in quantity highly accurate replicas of the original gold surfaces was undertaken by the Electroforming Division of the U.S. Rubber Company which is now a part of the F. A. Ringler Company. The problem was to devise a method of electroplating in which the deposited layer had sufficient adherence to the gold to follow the surface contour to an accuracy on the order of 1 microinch, and which later could be stripped from the gold without either mechanical or chemical damage to either surface. The solution of this problem required several years of experiment and development work but has now been solved satisfactorily. The replicas which are to be used are made of pure nickel. The replica taken from the original gold surface is used as a master for the production of further nickel replicas which are in turn used as submasters for further duplication.

The replicas which are available commercially are negatives of the original gold surface and are five generations removed from the original ruling. This was found necessary since each duplicating process involves trimming the edges of the original sample in order to part the duplicate from the original. This means that only a limited number of replicas can be made from each master. A single calculation showed that a sufficient number of replicas could not be made available until the fifth generation was reached. An incidental problem which came up during this development was that of producing an essentially stress-free nickel



Chrysler Corporation

Figure 3

This "research profile recorder" is used to calibrate the completed master specimens

General Motors

Figure 4. Dr Lewis (right) is pointing to replica specimens of surface finish roughness standards being checked under the microinterferometer. Arthur F. Underwood of G-M Research Laboratories is at left

plate. If stresses are present, the electroplated layer tends to warp and lose its flatness. If this process continues during several successive duplications, the final surface may be seriously distorted. The end product of the duplicating process is given a very thin (1 to 2 microinches) coating of rhodium for additional corrosion and abrasion resistance. The hardness of the specimens is approximately 35 Rockwell "C," which is adequate to withstand repeated measurements.

The problem of measuring the surface contour of the specimens and determining how closely a given ruling corresponds to the intended contour also demanded considerable development before accurate results could be obtained. Completed masters are calibrated by Chrysler Corporation research engineers using the profile record—shown in Figure 3. The depth of ruling of the finer specimens is of the order of a wave length of light, so that a direct optical examination of a cross section of a specimen is not practical. The basic approach used for measuring the surface contour of these specimens is the method of taper sectioning originally suggested by H. R. Nelson of Battelle Institute. The basis of this method is shown in Figure 5.

If, instead of a vertical cross section, one making a small angle to the original surface is used, an added apparent magnification in one direction can be obtained. This added magnification is inversely proportional to the sine of the taper angle, and if small angles are used can be made significantly large. In calibrating these specimens, an angle of approximately $2\frac{1}{4}$ degrees is used, giving an added vertical magnification of 25 times. This is sufficient to enable accurate measurements to be made with an optical microscope. Figure 6 shows the appearance of one of the finished specimens on a microscope screen when taper sectioned.

Figure 7 shows the actual cross section of one of the coarser specimens. The vertical distortion introduced by the taper section is readily apparent.

For comparison, a taper section of

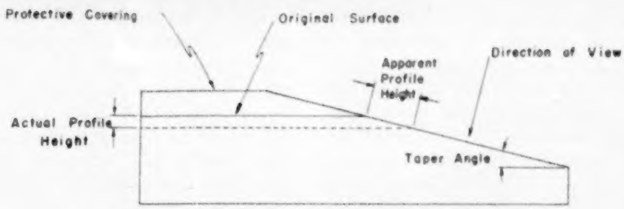


Figure 5. Nelson's method of taper sectioning

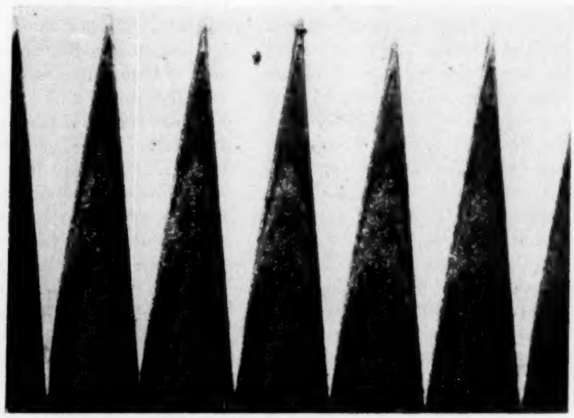


Figure 6. Taper sectioned specimen shown on microscope screen

Figure 7. Actual cross section of one of the coarser specimens

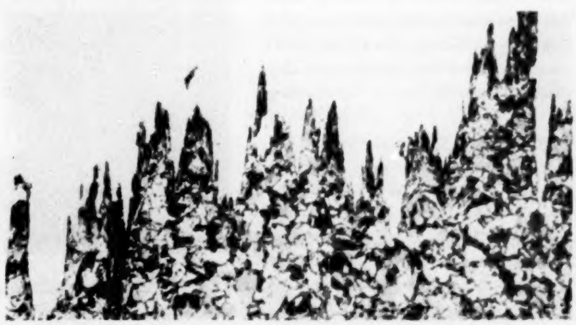


Figure 8. Taper section of a conventionally ground surface

a conventionally ground surface is shown in Figure 8 to illustrate the great increase of uniformity of surface contour which has been achieved in the reference specimens.

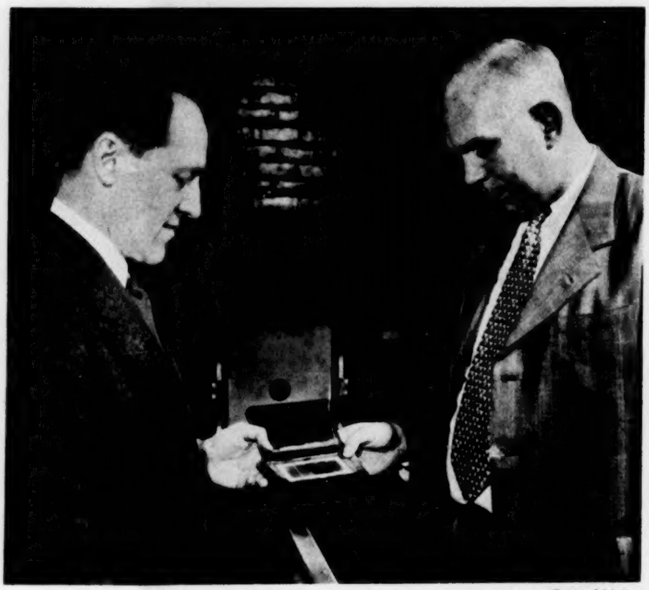
In calibrating a test ruling to decide whether it is sufficiently accurate to be used in a series of specimens, a total of 1800 individual measurements is made of the image on the microscope screen. This number of measurements is needed to determine accurately both the average dimensions of a surface and to insure that no significant deviation from this average occurs at any portion of the ruling. The microscope used for this work is calibrated by a stage micrometer which has in turn been calibrated against a standard scale certified by the National Bureau of Standards. If the measured contour depth of a surface departs by more than 3 percent of the nominal value or by 1 microinch, whichever is the larger, it is not accepted for inclusion in the series of specimens.

At present, the available set of Precision Reference Specimens consists of five blocks, the 20, 32, 50, 80, and 125 microinches. They are measured in arithmetical average. This group, shown in Figure 9, allows the calibration of surface roughness instruments at sufficient points on the scale (or scales) to check the accuracy of the readings. Frequently, several scales are used on such devices to expand the smoother values. These five blocks will usually allow each scale to be checked in two places, thereby evaluating the linearity of the instrument. Before using the blocks, they should be wiped off with a soft cloth to remove hard particles which could cause wear and damage. Although the surfaces are protected by a thin overplate of rhodium, it is possible to injure them by dirt.

Care must be taken to use only sufficient pressure to give good contact when applying the stylus or other device to calibrate the instrument. Too high a pressure will burnish down the peaks of the roughness rulings.

The blocks are extremely simple to use. The instrument to be checked is operated in exactly the same manner as specified for measuring the roughness of a machined surface and the meter reading is noted. With every set of blocks is a table showing what each roughness block should read depending on the radius of the diamond stylus and to take account of any other necessary corrections. For example, the "20" block, according to table, may show that a 0.0005-in. radius stylus should read 16 microinches (arithmetical average). This block when measured by the instrument indicates 14 microinches. One must then decide if the calibration of the meter is close enough or whether a correction factor should be applied to all readings taken in this range. Alternatively, the instrument may have an adjustment for setting the meter to the correct value. However, before adjusting the meter, it is necessary to check the diamond for bluntness or chipping. This is done by reading the meter on the 80 or 125 block and on the 20 block. If the same correction factor is not applicable to both measurements, the diamond is likely to need replacement. Thus, if the 125 block reads 120 while the 20 block reads 10, it is likely that the diamond is damaged. The instrument may also have lost its linearity. Under such circumstances the device must be properly serviced before any minor adjustments can be made or correct readings taken.

The development of these specimens has been an outstanding example of cooperation between major corporations to fill an obvious need for industrial standards. The Precision Reference Specimens are being made available to everyone without royalties or other provision for recovering the development expenses. Although they have been available only a few months, they have already been adopted as standards by the Society of Automotive Engineers. They meet the specifications of American Standard B46.2-1952, Physical Specimens of Surface Roughness and Lay, Part 1, which has recently been published as an American Standard under the sponsorship of the Society of Automotive Engineers and the American Society of Mechanical Engineers.



General Motors

Figure 9. Dr Lewis (left) and Mr Underwood are examining first replica specimens of surface finish roughness standards made from gold master blocks and accurate to one-millionth of an inch

How to Check Rayon Fabrics

FIFTY-ONE standards for rayon and acetate fabrics, approved in June by the American Standards Association, provide performance requirements to make it possible for consumers and retailers, as well as ready-to-wear manufacturers and buyers, to select the fabric best suited for the purpose for which it will be used. Performance requirements are specified for rayon, acetate, and mixed fabrics used in 24 different types of women's and girls' wearing apparel, in 16 different types of men's and boys' wearing apparel, and in 11 different types of home furnishings.

"The establishment of these standards will give confidence to the retail buyer, to the fabric buyer for the ready-to-wear industry, and in turn to the consumer," said Vice Admiral G. F. Hussey, Jr, Managing Director of the American Standards Association, in announcing approval of the standards. "They will know that the goods will be sold on a sound technical basis, since the orders can include a requirement that they meet these standards. Sales people in the stores will have concrete information at their elbows to inform their consumers about the goods covered by the standards."

The standards were developed by an ASA sectional committee sponsored by the National Retail Dry Goods Association. An editorial committee is now giving them a final review in preparation for publication. It is expected that copies will be available in the Fall.

In each standard, specifications and tests for laundering, washability, and reaction to dry cleaning are provided.

The tests specify 2.5 percent as allowable shrinkage in laundering. Colorfastness to laundering, cleaning, perspiration, pressing, sunlight, and atmospheric fading is specified. Special provisions are made for colorfastness to salt, pool, and fresh water for bathing suits. A basis for crease resistance claims is provided. Test methods also include those for flammability of fabrics.

Each of the 51 standards includes also a provision for strength of fabric. While sheer dress fabric calls for only a few pounds breaking strength, a fabric for an athlete's uniform (football pants or jacket, for example) calls for 100 pounds breaking strength.

In all, 31 different test methods are provided to check the performance of the various fabrics. They come from such different sources as the American Society for Testing Materials and the American Association of Textile Chemists and Colorists, from Commercial Standards, and from test methods that have been established by individual concerns. Typical standards and test methods in this last category include the Tebelized or Monsanto Method for crease resistance, American Viscose Corporation's permanence of finish to dry cleaning and laundering, and U.S. Testing Company's yarn shifting (distortion) of woven fabrics.

By definition in the new standards, the terms *rayon* and *acetate* include all fibers deriving from a cellulose base regardless of the manufacturing process. The terms *rayon, acetate,* and *mixed fabrics* refer to fabrics containing more than 50 percent of rayon or acetate fibers. The balance of the fibers may be nylon, dacron, cotton, wool, or any of the new fibers coming into use in textiles.

The National Retail Dry Goods Association, which sponsored the rayon project, has emphasized that the consumer is primarily interested in the serviceability of the fabric rather than in the fiber content. This principle is the foundation of these American Standards for rayon, acetate, and mixed fabrics.

The National Retail Dry Goods Association initiated the rayon project in the autumn of 1949 through the facilities of the American Standards Association. Chairman of ASA Sectional Committee L22, in charge of the project, is J. D. Runkle, vice-

Resistance to sunlight fading is included in standard requirements for rayon fabrics. Colors are tested in this Fade-Ometer.

president and general manager, Crowley, Milner and Company, Detroit.

One of the problems which the American Standards Association faced in considering approval of the standards was the determination of the existence of a true national acceptance. Following the completion of the technical work in the subcommittee stage all producing groups which had participated withdrew to an observer status on the grounds that the producers had insufficient interest in the standards at that time. Under ASA procedure all groups have the inherent right to participate, but they must exercise their own judgment as to the extent of that participation. The ASA, however, in approving the standards gave particular attention, through a special study committee, to the position of the producers.

A plan for the informative labeling and certification of rayon, acetate, and mixed fabrics has been worked out and approved by ASA Sectional

(Continued on page 261)

ASTM—ITS FIRST FIFTY YEARS

FIFTY years ago, in 1902, the U.S. Committee of the International Society for Testing Materials became a full-fledged society in its own right. As the American Society for Testing Materials it was formally incorporated in that year and became an independent national technical society. This year, June 22-28, ASTM celebrated its Golden Anniversary in a week of meetings during which representatives from all over the world met to do it honor.

In the intervening 50 years the Society has grown from a membership of 168 to 7,300. It has maintained its standards of technical reliability and integrity to the point where ASTM standards are recognized and used throughout the world. From about 10 standards in its first year, its record of achievement now shows some 1900 standards of about 10,000 pages developed by ASTM technical committees and published as ASTM standards. The success of its efforts can be measured by the fact that thousands of copies of separate standards are distributed annually in addition to its *Books of Standards* and special compilations. Many large companies incorporate ASTM specifications in their own groups of standards, and most modern municipal and state building codes embody large numbers of ASTM standards in the materials sections of the code.

As ASTM itself points out, however, statistics do not by any means tell the complete story.

Some 50 years ago the chief aim and object of the newly organized ASTM were outlined by its retiring President, Henry Marian Howe. "The testing of materials has two chief features," he commented. "First, the manner in which tests shall be conducted, and second, the specifications which the materials tested must endure." There were differences, however, as to what constituted the most important part of the program. "The European members of the International Association in general regard the former—the manner of conducting tests—as the primary object of the Association, and the second—the reception specifications—as a thing for later consideration," Mr Howe explained. "But we American members . . . look at the matter from a radically different standpoint, and look to the erection of normal or standard reception specifications as by far the more important object. It appears to us that buyer and seller have greater difficulty in agreeing on the specifications which the material bought and sold must fulfill than in agreeing on the methods to be used for deciding whether those specifications, once agreed on, are fulfilled by a given lot of material."

This difference in viewpoint was one of the compelling reasons for the decision of the American group to assert its independence. Because other countries were interested primarily in research and test methods rather than in standards, it was believed that a separate organization could best serve American interests in the development of standards needed by America's expanding industries.

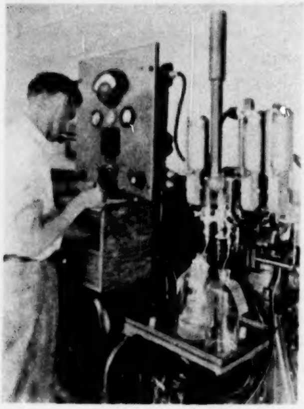
The new organization expected to be a strong influence in encouraging reasonable exchange of ideas and viewpoints in industrial and commercial relations, Mr Howe explained.

"We do not expect, nor do we think it important," he said, "that the standard specifications which we erect shall be exactly complied with in many, or indeed in any, actual transactions. But we are firmly convinced that the existence of such standard specifications, stamped as standards of reasonableness by a properly constituted body such as we aim to be, will greatly facilitate agreement between buyer and seller, will help them to come to terms, to convince each other that this or that item specified by one of them and objected to by the other is or is not reasonable. . . . standards of reasonableness such as we wish to erect should greatly aid reasonable men in deciding what is reasonable."

Arthur N. Talbot, long-time Dean of Engineering at the University of Illinois, and a president of ASTM, has explained why the American group considered this service so important. He said:

"Few of the younger generation realize conditions attending the purchase and use of engineering materials as late as the last years of the nineteenth century. Regardless of information possessed in some lines and of satisfactory relations between many sellers and buyers, the general conditions of that time might be called primitive when compared with present practice. Variability in the products offered by the producer and variability in the demands of the consumer, sales talk of seller and fiat demands of the buyer, trade-mark products and 'acceptable to the buyer,' paucity of knowledge of properties of products and even ignorance of needed requirements, differences in viewpoint of buyer and seller, and inability to make definite specifications satisfactory to both—all these and many other differences of view were symptoms of the semi-chaotic condition in the relations between buyer and seller. Under such circumstances it was not strange that the American Section of the International Association for Testing Materials that first met in 1898 quickly changed into the American Society for Testing Materials in 1902, especially as the intervening years were times of increasing activity in industrial and constructional work."

How well ASTM has carried out these ideas and how it has proved its value to this country's industry and



American Petroleum Institute

ASTM D-2 on Petroleum Products, also organized as ASA Sectional Committee Z11, has broad program

economy is evident in the number and activity of its technical committees.

Currently there are at least 2,000 main committees, sections, and related subgroups. At national meetings of the Society there may be as many as 500 committee meetings in a five-day period. Some 450 meetings were held during the anniversary celebration in June of this year. Some of the technical committees are almost like small societies. Committee A-1 on Steel, organized in 1898, currently has more than 350 men on its mailing list with more than 150 standards in its charge. Committees C-1 on Cement and D-1 on Paint, Varnish, Lacquer, and Related Products, almost equally as large, also celebrate their fiftieth anniversary this year.

Seventy-five main technical groups cover a wide gamut of families of materials, (steel, copper alloys, road and paving materials, textiles, petroleum products, as examples) with a total membership (not including duplications) of some 4,000.

ASTM committees cooperate with other groups on research projects and important investigations. A technical project on automotive rubber is jointly sponsored with the Society of Automotive Engineers, for example. One on effect of temperature is sponsored with the American Society of Mechanical Engineers; filler metal with the American Welding Society; paper testing methods with the Technical Association of the Pulp and Paper Industry; soap analysis with the American Oil Chemists Society; and textile test methods with the American Association of Textile Chemists and Colorists, to name a few.

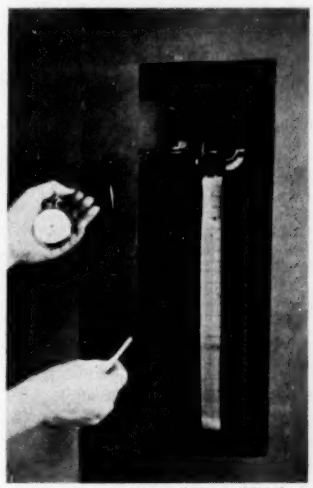
To make its work on standards most effective, ASTM has changed its original procedure which required that all actions on standards must be taken at an Annual Meeting of the Society. In line with the speedier tempo of the present day, it is now possible to publish new and revised standards as well as proposed changes in standards throughout the year. An Administrative Committee on Standards, composed of outstanding materials experts and industrial administrators, has authority to determine whether the necessary consensus has been established on recommendations from technical committees received throughout the year.

J. C. Penney Co, Inc

One of ASTM's textile tests—colorfastness to laundering

Its interest in standards was carried a step further by ASTM when with the four engineering "Founder" societies it helped establish the American Engineering Standards Committee (now the American Standards Association) in 1918. This move was intended to provide a clearing house for standards—where standardizing organizations could coordinate their work and prevent duplication of effort. ASTM has always taken an active part in ASA affairs. A former ASTM president—J. R. Townsend—is now chairman of ASA's Standards Council. ASTM is a member of nearly all of ASA's correlating committees and of many sectional committees in charge of the development of American Standards. In some cases it has joined with other associations to sponsor standardization projects under the procedure of ASA, such as cast iron pipe and fittings, fire tests for building construction and materials, and wrought-iron and wrought-steel pipes and tubing. The Association's leadership and participation in ASA activities is evidenced by the large number of ASTM standards that are processed through ASA each year for approval as American Standard.

The close relationship of ASTM and ASA was given recognition during the anniversary celebration in a special session on standards and research sponsored by ASTM and the Conference of Executives of Member Organizations of the American Standards Association. This session was recognized as a memorial to the late C. L. Warwick, ASTM's Executive Secretary from 1919-1952 who had served as the first chairman of the Conference from 1945 through 1948. On the program were T. E. Veltfort, manager of the Copper and Brass Research Association and chairman of CEOM; Norman L. Mochel, manager, Metallurgical Engineering, Westinghouse Electric Corporation; T. S. Fuller, engineer in charge of Works



National Bureau of Standards

Flammability tests are needed for safe use of many different materials. This is a test on plastic glazing materials

Laboratory, General Electric Company, Schenectady Works, retiring president of ASTM; Harold L. Maxwell, Section Supervisor, Mechanical Engineering Consultant, E. I. duPont de Nemours and Company, Inc, ASTM President-elect; L. C. Beard, Jr, Assistant Director, Socony-Vacuum Laboratories, Socony-Vacuum Oil Company, Inc; John R. Townsend, Director of Materials Applications Engineering, Bell Telephone Laboratories, Inc, currently also Consultant to the Director of Defense Mobilization on Conservation of Materials, chairman of ASA's Standards Council, ASTM past president; R. E. Hess, Acting Executive Secretary, ASTM.

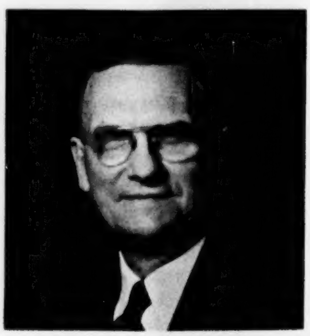
Of the 7,200 ASTM members, about 5,150 are individuals, Government departments, libraries, etc, classed as individuals; about 1800 are companies and associations; 250 are sustaining members; and 120 individuals are Junior Members. About 20 percent of the individuals are in management or executive positions; about 55 percent are technical and engineering personnel; about 25 percent, professors, sales, libraries, etc.

Among those honored at the Society's anniversary celebration were ten members who have been associated with the Society since its incorporation in 1902. These ten received 50-year membership certificates:

Charles Derleth, Jr
William C. Du Comb
Bradley Stoughton
Ajax Metal Division of H. Kramer and Company
E. L. Conwell and Company
International Harvester Company
Jones & Laughlin Steel Corporation
Lukens Steel Company
The Sherwin-Williams Company
Standard Steel Works Division, Baldwin-Lima-Hamilton Corporation

George H. Harnden and H. S. Mattimore were among those who received ASTM's 1952 Award of Merit for long and outstanding service in connection with ASTM activities. Mr Harnden is Specifications Engineer, Standards Division, Executive Department, General Electric Company, and is chairman of ASA's Miscellaneous Projects Correlating Committee. Mr Mattimore, Engineering Consultant, is a representative of the American Society of Civil Engineers on Sectional Committee A37, Methods of Testing Road and Paving Materials. Others honored were Wheeler P. Davey, Professor of Physics and Chemistry, Pennsylvania State College; Jay C. Harris, Assistant Director, Central Research Department, Monsanto Chemical Company; Jerome J. Kanter, Directing Engineer, Engineering Laboratories, Crane Company; Douglas E. Parsons, Chief, Building Technology Division, National Bureau of Standards; Hugh M. Robinson, Service Engineer, Underwriters' Laboratories, Inc; John D. Sullivan, Assistant Director, Battelle Memorial Institute; Ray Thomas, Staff Engineer, Carbide and Carbon Chemicals Division, Union Carbide and Carbon Corporation; and Fred D. Tuemmler, Head, Analytical Standardization Department, Shell Development Company.

Some 40 technical sessions were held during the anniversary meeting. Of these, 23 were symposiums; the rest were report sessions, round tables, or were devoted to groups of papers on specific subjects. The Society's largest exhibit of testing apparatus and scientific instruments was held during this meeting. As a result of recommendations in the 70 or more committee reports presented at the meeting, 75 new specifications and tests were approved for publication for the first time. Most of the committees have concentrated on revising their standards to bring them up to date for the new 1952 edition of the six-volume *Book of ASTM Standards* to be issued late this year. They have also reviewed tentatives to be adopted as final standards. Some 90 existing tentatives were recommended for adoption as formal standards; action on this latter group is subject to Society letter ballot.



Dr Harold Lee Maxwell

All the headquarters work of the Society is handled by a staff of about 60. Recently, the Society announced the addition of a staff engineer to aid the Office of Defense Mobilization in developing methods of conservation of scarce materials through the use of substitute materials or through more efficient use of materials. The Society has had its own building in Philadelphia since 1946, and has recently acquired additional land looking toward further expansion. Only two secretaries have headed the ASTM staff since its organization 50 years ago. Edgar Marburg served from 1902 through 1918. The famed Edgar Marburg Lecture, given each year by an outstanding scientist, honors the Society's first secretary because of his "zeal, industry, loyalty, insight, and high ability," and his "powerful influence on the character, standing, and usefulness of the Society." This year Dr Robert C. McMaster of Battelle Memorial Institute presented the lecture on "Nondestructive Testing."

C. L. Warwick served as head of the ASTM staff from 1919 to 1952. The sudden and tragic death of Mr. Warwick in April cast a shadow over the Society's anniversary celebrations.

The first president of ASTM was Charles Benjamin Dudley, a Civil War veteran and for 35 years Chief Chemist and Metallurgist of the Pennsylvania Railroad. He established the first Railroad Chemical Laboratory.

ASTM's new president, elected at the June meeting, is Harold Lee Maxwell, Supervisor of Mechanical Engineering Consultants, E. I. duPont de Nemours & Company, Inc. Widely known as an authority on metallurgy and engineering materials for constructing chemical manufacturing equipment, Dr Maxwell has been associated with ASTM for many years.

The President's Luncheon at the anniversary celebration welcomed official delegates of many American societies, associations, and Govern-

(*Continued on page 260*)

Left to right: Dr John Gaillard, ASA; R. C. Peterson, Chairman, ASTE Standards Committee; Mr Gay

A New Frontier for Industry

Report of a speech delivered by Roger E. Gay, President, The Bristol Brass Corporation, and President of ASA, at the March 17 meeting of the American Society of Tool Engineers.

STANDARDIZATION offers a new frontier, a dramatically expanding opportunity to achieve the American objective of raising wages and lowering prices through lower unit costs, Roger E. Gay, president of the Bristol Brass Corporation, and president of the American Standards Association, told the Society of Tool Engineers at its meeting March 17. "I feel confident," he said, "that work in standards during the next 50 years will far surpass any accomplishments of the past half century."

Outlining the problems that face U. S. industry, Mr Gay said, "Today we are in the middle of an expansion and modernization program that makes everything that went before it look like peanuts. It is so fantastic in its size that not many Americans—not even all engineers—actually realize how big it is. Even less do they appreciate its possible revolutionary long-range effects on our economy.

"A whole new industrial base is being laid down in our country," he said. "Our output during the past three years has shot up more than one-third as much as it did during the previous 20 years. The oil industry spent 10 billion dollars after the war for capital expansion and increased its crude oil production and refining capacity by almost one-third. Now it is spending three billion more to boost output another billion dollars a day—a 14 percent increase. The electric light and power industry nearly doubled its generating capacity in the 1940's, and in 1950 produced nearly 400 billion kilowatt hours. Now it is spending 2½ billion dollars to raise capacity another 40 percent. Steel now has a productive capacity half again as large as when World War II began and nearly one-third larger than when it ended. Additions to steel capacity under the present mobilization program will equal the total expansion of the 1940's.

"What will we do with our swollen capacity to produce when the present emergency is resolved?"

"A sales-conscious American industry will be faced with the serious problem of the high break-even point. We have had an almost unbroken sellers' market for 12 years. Business profits have been possible because of abnormally high volume and low distribution costs in this market. The fixed costs of every American company and industry are higher and more rigid than ever before in our history. Since 1940 in the average American company there has been a doubling of average wage, capital investment, taxes per employee, sales per employee, and the number of employees. But net income per employee has increased less than half. In other words, you now have to move twice as much dollar sales per employee to pay current costs and maintain a prewar profit level.

"A comparatively minor rise in costs or drop in volume, in the face of a thin profit ratio, could cause a major drop in profit. That could lead to trouble, not only for the individual company concerned, but for the national economy as a whole, and for the other free nations of the world whose stability depends on our stability.

"The salesman and the engineer already have helped America to develop the revolutionary industrial concept of mass production. The engineer, the tool engineer if you will, made mass production physically possible. The salesman provided the mass market for this production."

"These American Standards which are being established each day, from electric wiring to circus tents, from electric ranges to industrial machines, provide the tools to help us keep our old customers and win new ones," he explained. "We need a sales and distribution machine in this country as good as the production machine you engineers have created for us. We are going to have to move volume. We must mass-produce customers on a vast scale.

"Standards are a stimulant to sales. They provide a sound basis for comparison by our customers, the men and women who purchase and use the products that you and I make and sell.

"In industry and business, standards provide a quality and guarantee to help attract customers. Where there are no standards, or where they are inadequate or wrong, there are delays, lack of harmony and understanding, products that just don't fit, and the withdrawal of a customer from the market.

"There is one way that we who are responsible for promoting better and more realistic standards can achieve success. That is by taking the customer's viewpoint into account so that the standard, when adopted, already has a large measure of acceptance. The idea is that everyone who is affected by the standards should help to make them—the manufacturer, designer, distributor, seller, consumer, the government. That is why you and I have seen orders for a material complying with the standard automatically start coming in as soon as a new standard is announced.

"While there are many ways of cutting costs, there is no adequate substitute for expanding sales and for using with skill and vigor the tool of standardization."

Double Feature . .

1852 1952

NATIONAL STANDARDIZATION CONFERENCE

CENTENNIAL OF ENGINEERING

CHICAGO will be the scene of the Third National Standardization Conference this year. Taking as its theme, *Standards—Engineering Tools for Industry*, the Conference will help to celebrate the Centennial of Engineering. Its headquarters will be the Museum of Science and Industry; 57th Street and South Shore Drive, Chicago, Ill.; the dates, September 8-10.

An address by Roger E. Gay, president, The Bristol Brass Corporation and president of the American Standards Association, will open the Conference Monday morning, September 8.

Joseph W. Barker, president of the Research Corporation, New York, will keynote the Conference at the opening session. As head of an organization which has distributed nearly $7,000,000 in the form of grants in aid of research, Dr Barker has his finger on the pulse of scientific and engineering development.

Through its funds his Corporation has contributed materially to scientific and engineering progress. The Williams-Waterman Fund, for example, is supported by income from patents on the synthesis of vitamin B_1. Part of this fund goes to the research in general and part to the field of nutrition. The Kendall-Hinch Fund honors pioneers in the discovery, syntheses, and use of cortisone. It has so far been directed to work in the field of endocrinology. The Corporation's general grants for individual researches are principally in the field of physical sciences. Its grants are assisting researchers working on superconductivity, superfluidity, and supersound. The first cyclotron received its first outside help from these grants in the early 1930's. The first coronographs in this country were constructed and installed with the help of Research Corporation grants. Ultracentrifuges, mass spectrographs, linear accelerators, and the Van de Graff generator received Research Corporation support at stages of their development when lack of funds might well have meant their abandonment.

Dr Barker has been head of the Corporation since 1945. He had previously been dean of the engineering faculty at Columbia University, and had been granted a leave of absence from Columbia to serve as special assistant to the Secretary of the Navy from 1941 to 1945. He received for this service the U. S. Navy Distinguished Civilian Service Award.

Dr Barker has taken an active interest in the work of national associations and societies. He served as vice-president of the American Institute of Electrical Engineers in 1940, as president of the Illuminating Engineers Society in 1932 and 1933. He is a member of the Board of Trustees and Chairman of the Finance Committee of the Educational Testing Service, a member of the Commission on Technical Assistance of the Engineers Joint Council, a member of the Board of Governors of the Scientific Research Society of America and of the Committee on Research of the National Association of Manufacturers.

In Chicago, the National Standardization Conference will take place during what is expected to be the greatest convocation of engineers ever held anywhere in the world. Participating in the ceremonies will be 61 American engineering societies and delegations from the leading countries of Asia, Europe, and Latin America. The Centennial commemorates the founding 100 years ago of the first society of civilian engineers in this country—forerunner of the present American Society of Civil Engineers. From this organization all other engineering societies developed.

An exhibit occupying 10,400 square feet of floor space will demonstrate the technical, economic, and social factors that make America tick. Standards will have their place in these exhibits. The Cincinnati Milling Machine Company, for example, will tell the story of the machine tool industry. It will stress how much depends today on interchangeability of parts and what this means in time and labor saving and in making industrial goods less costly to buy.

"Adam to Atom", a stage production dramatising America's industrial growth, will be presented daily.

An innovation at this National Standardization Conference will be a registration fee of $2.00 per session or $10.00 for all sessions. A copy of the published proceedings will be sent all those registered.

Joseph W. Barker

Preliminary Program
Third National Standardization Conference

IN CONJUNCTION WITH

The Centennial of Engineering

September 8-10, 1952

THEME: *Standards—Engineering Tools for Industry*

Roger E. Gay

MONDAY, SEPTEMBER 8

TIME-PLACE	MEETING—SPEAKERS
10:00 A.M. Little Theatre	*Opening Session*—Sponsored by the Company Member Conference of the American Standards Assoc and the Committee on Standardization of the National Assoc of Purchasing Agents *Presiding:* **S. H. Watson,** RCA Victor Division, Radio Corp of America, Camden, N. J., Chairman of the CMC *Opening Address:* **Roger E. Gay,** President, The Bristol Brass Corp, Bristol, Conn, and President, ASA *Keynote Speaker:* **Joseph W. Barker,** President, Research Corp, New York, N. Y., "Standards —Engineering Tools for Industry" "Standards for World Trade—An Opportunity for American Leadership"—*A report on the Second Plenary Session of the International Organization for Standardization (ISO)*—**Cyril Ainsworth,** Technical Director, American Standards Assoc, New York, N. Y.
2:00 P.M. Little Theatre	*Continuation of the Morning Session*— "Standards — A Procurement Tool" — **E. H. Weaver,** Manager of Purchases, Union Oil Co of California, Los Angeles, Cal, Chairman, National Committee on Standardization of the National Assoc of Purchasing Agents
2:00 P.M. ***	"Purchasing—Standardizing Coordination in Company Operations" *Moderator:* **C. F. Ogden,** Manager of Purchases, The Detroit Edison Co., Detroit, Mich, Past President, National Assoc of Purchasing Agents *Panel:* ***W. H. Kiler,*** Principal Standards Engineer, E. I. du Pont de Nemours & Co, Wilmington, Del; **L. J. Jacobi,** Supervising Engineer, Inspection and Standards, The Detroit Edison Co, Detroit, Mich; **E. S. Page,** Special Assistant to the Executive Vice-President, American Machine and Foundry Co, New York, N. Y.; **Lee R. Forker,** General Purchasing Agent, Quaker State Oil Refining Co, Oil City, Pa.
2:00 P.M. International Harvester Theatre	*A New Approach to Cost Reduction in the Building Industry* — Sponsored by the American Institute of Architects, National Assoc of Homebuilders, and The Producers' Council *Moderator:* **Colonel Willard Chevalier,** Executive Vice-President, McGraw-Hill Publishing Co, New York, N. Y. *Panel:* **Arthur Bohnen,** representing the National Assoc of Real Estate Boards, Chicago, Ill.; **F. M. Hauserman,** President, E. F. Hauserman Co, Cleveland, Ohio, and Director of The Producers' Council; **Gannett Herwig,** Alfred Hopkins & Associates, New York, N. Y.; **William Kinne,** Professor of Architecture, University of Illinois, Urbana, Ill.; **William H. Scheik,** Executive Director, Building Research Advisory Board of the National Research Council, Washington, D. C.

TUESDAY, SEPTEMBER 9

MEETING—SPEAKERS	TIME-PLACE
Outstanding Accomplishments in the Development of National Standards—Sponsored by ASA's Standards Council *Welcome of U.S. Government Department Representatives* *Presentation of Service Awards to Eligible Council Members* *The Story of the ASME BOILER CODE and its National and International Significance* *Report of the Committee on Procedure of the Standards Council* *Presiding:* **J. R. Townsend,** Bell Telephone Laboratories, Inc, Murray Hill, N. J., and Chairman, Standards Council	10:00 A.M. Little Theatre
The Engineering Significance of Standards—Open Meeting of the Conference of Executives of Organization Members of the ASA—A Forum for executives of technical societies and trade associations *How Standards for safety can help reduce insurance premiums—improve industrial relations* *What standardization has meant in the economics of engineering and design and utilization of products* *How three industries initiated and developed their standards in different ways—and how they all benefited* *Presiding:* **T. E. Veltfort,** Manager, Copper and Brass Research Corp, New York, N. Y., and Chairman, CEOM	2:00 P.M. International Harvester Theatre

WEDNESDAY, SEPTEMBER 10

MEETING—SPEAKERS	TIME-PLACE
The Chemical Industry's Approach to Procurement Standards—Sponsored by the Chemical Industry Correlating Committee of ASA *Moderator:* **W. T. Nichols,** Director, General Engineering Dept, Monsanto Chemical Co, St. Louis, Mo. *Panel:* *Industry's Position*—**Granville M. Read,** Chief Engineer, E. I. du Pont de Nemours & Co., Wilmington, Del *The Supplier's Position*—**F. S. G. Williams,** Vice-President, Taylor Forge and Pipe Works, New York, N. Y. *The Chemical Industry Correlating Committee's Position*—**J. G. Henderson,** Carbide & Carbon Chemicals, Division of Union Carbide & Carbon Corp, South Charleston, W. Va, and Chairman, C.I.C.C. *The closing of the Conference at 12:00*	10:00 A.M. Little Theatre

Standards From Other Countries

Members of the American Standards Association may borrow from the ASA Library copies of any of the following standards recently received from other countries. Orders may also be sent to the country of origin through the ASA office. The titles of the standards are given here in English, but the documents themselves are in the language of the country from which they were received. For the convenience of our readers, the standards are listed under their general UDC classifications.

003.62 Signs, Notations, Symbols

Belgium — NBN
Methods of writing numbers and symbols for different units — 136

France — NF
Rules for writing numbers, units, magnitudes, etc — X02-003

Israel — SI
Abbreviation of Units of Measurement — 22

United Kingdom — BS
Scheme of symbols for welding — 499:Section 7:1952

05 Periodicals, Reviews

Belgium — NBN
Layout of periodicals — 246

017-019 Catalogues

Belgium — NBN
Editor's index cards, analytical bibliographic cards, etc — 261

025 Library Administration

Belgium — NBN
Bibliographical References — 245

Spain — UNE
Library index cards, specifications for stock — 1056
Two printed forms for library index cards — 1057, 1058
Library cards for recording new acquisitions — 1050

53 Physics and Mechanics

Spain — UNE
Standard temperature, standard pressure and standard conditions. Definitions — 5007, h. 1,2

389 Metrology, Weights and Measures, Standardization

Germany — DIN
Preferred numbers — 323,B1.1

526 Geodesy and Cartography

Spain — UNE
System of conventional angles and axes used in geodesy and topography — 5022

532 Mechanics of Fluids, Hydraulics

India — IS
Determination of Viscosity (or fluidity) of solutions of cotton and regenerated celluloses in cuprammonium hydroxide — 244

535 Optics, Light

Belgium — NBN
Photometry—Vocabulary, Part 1: General Notions, Values, Units — 61

620.11 Preliminary Investigation of Material Sampling

Belgium — NBN
Preparation and Conditioning of Specimen and Test Pieces — 148

621.1 Steam, Steam Engines, Boilers

Spain — UNE
Basic characteristics of steam boilers — 9004
Basic characteristics of hot-water boilers — 9005

United Kingdom — BS
Loco-type multitubular boilers of riveted construction — 931:1951

621.18 Steam Boilers

Spain — UNE
Stay bolts for steam boilers — 25037

United Kingdom — BS
Welded steel boilers for hot water central heating and hot water supply — 855:1952

621.9 Machine Tools, Tools, etc

France — NF
Milling cutter arbor end — E 64-101
Drills, general specification — E 66-060

Germany — DIN
Set of Three Taps for Whitworth Thread, from 1/16 to 3 in. — 351
Set of Three Taps for Metric Thread, from M1 to M68 — 352
Nut Taps for Whitworth Thread, from 1/8 to 3 in. — 356
Nut Taps for Metric Thread, from M3 to M68 — 357
Sets of Two Taps for Fine Metric Thread, Pitches 0.2-0.25-0.35-0.5-0.75-1.0-1.5-2.0 and 3.00 mm — 2181, B1.1-5
Different states of technical surface finishes — 4760-4762

Spain — UNE
Terminology of Lathe parts — 15411
Terminology of Tourret lathe parts — 15421/2
Direction of Rotation of Machine Tools — 15412

Union of Soviet Socialist Republics — GOST
Reamers with inserted teeth and Morse taper shank — 883
Countersink cutters with inserted teeth — 2255

United Kingdom — BS
Pipe cutters — 1857:1952

621.438 Gas Turbines

Spain — UNE
Gas turbines. Terminology — 10025

621.5 Operation, Adjustment and Control

Germany — DIN
"Star"-type Hand Knobs — 6336

621.592 Braking and Stopping Devices

Israel — SI
Hydraulic brake fluid, heavy and medium duty types — 47 and 48

621.64 Devices for Conveyance and Storage of Gases and Liquids in General

France — NF
Two types of cocks for domestic gas appliances — E 29-129 and E 29-130
Storage oil tanks, riveted, for petroleum industry, general characteristics — M 87-101
Storage oil tanks, transportable, general characteristics — M 87-102
Storage oil tanks, welded, for petroleum industry, general characteristics — M 87-103
Oil refinery pipes. Dimensions — M 88-930

Germany — DIN
Wedge disc gate valves for nominal pressure 16 — 3226

Netherlands — N
Cocks for hoses in gas installation — 1595,1596
Stop valve for water main — 1707,1708
Draining cocks for water installation — N-1474

621.643 Conduits, Pipes, Accessory Parts

Germany — DIN
Cap nuts for pipes and fittings — 2356
Pipe connectors for plain pipes — 3851

Mexico — DGN
Steel pipes, black and galvanized for liquids, gas and steam — B 10-1951
Screwed pipe fittings — B 44

Spain — UNE
Asbesto-cement pipes — 41006
Asbesto-cement pipes. Determination of permeability, water absorption and heat resistance — 7036
Asbesto-cement pipes. Methods of test for internal pressure and resistance to bending stress — 7037

621.74 Foundry Work

France — NF
Die casting zinc and zinc alloys — A 55-010

621.75 Tools and Machinery Manufacture

Germany — DIN
Hollow Handle with 1:50 Taper — 2240

621.753 Tolerances, Fittings, Gages

Denmark	*DS*
Sixty-three standards for ISA tolerance system	800, 816.1-881.2

Germany	*DIN*
"Go" gage for nominal diameters from 1 to 30 mm	2248

621.791 Soldering, Welding, Cutting

Australia	*AS*
S.A.A. Boiler Code, Part 5—Welding	CB.1, Part 5-1951

Denmark	*DS*
Welding definitions. General	B.XI.1
Definition and representation of fusion welds	B.XI.4/5
Drawing symbols for different types of welds	B.XI.13-17

Netherlands	*N*
Manual for arc welding	1062

621.82 Shafting, Couplings, etc

Spain	*UNE*
Profiles of splined shafts	26017
Straight spline coupling. Tolerances	26060/1

621.822 Bearings, etc

Spain	*UNE*
Steel balls for ball bearings	18001

621.83 Gears, Racks, etc

China	*CNS*
Specification for diametral pitch of gear	183(B85)
Specification for gear profile	184(B86)
Specification for interchangeable gear	185(B87)
Specification for teeth number of interchangeable gear	186(B88)

Germany	*DIN*
Basic profiles for gear generating tools	3972

Spain	*UNE*
Gears. Modular series	18005
Gears. Basic principles	18008

621.85 Flexible Transmission

Spain	*UNE*
V-belts	18006
Sheave groves for V-belts	18009

621.86 Means for Lifting and Transporting other than Cranes and Elevators

Germany	*DIN*
Bucket Conveyor	15256
Special Bolts and Washers for Conveyor Belts	15237

621.87 Hoisting Machinery

Austria	*ÖNORM*
Working and maintenance rules for cranes	M 9601
Testing of cranes	M 9602

Netherlands	*N*
Safety code for building elevators	1080

621.88 Means of Attachment, Fastenings

Austria	*ÖNORM*
Headless bolts and pins	M 5420
Bolts and pins with small heads	M 5421

Denmark	*DS*
Pipe thread, straight	7
Pipe thread, taper	8

Germany	*DIN*
Basic minor diameters of metric screws	769,Bl.4

Spain	*UNE*
Rivets, sizes and tolerances	27201
Rivets with truncated heads	27202,h 1,2

Sweden	*SIS*
Four standards for different types of castellated hexagon nuts	1471-1474
Two types of plow bolts with square neck, Whitworth thread	1500,1501
Socket head screw	1508
Link screws, metric and Whitworth thread	1524,1525
Set screws, metric and Whitworth thread (revised)	60,61
Two types of plow bolts with square necks, Whitworth thread (revised)	94,95
Wing screws, metric and Whitworth thread (revised)	208,209

United Kingdom	*BS*
Screw gage limits and tolerances	919:1952

621.89 Lubrication

India	*IS*
Cylinder oil, pure, mineral, ordinary	311
Cylinder oil, compounded, ordinary	312
Cylinder oil, pure mineral, superheat	313
Cylinder oil, compounded, superheat	314
Cylinder oil, pure mineral, filtered	315
Cylinder oil, compounded, filtered	316

622 Mining

Germany	*DIN*
Compressed air hoses for mines	20018
Pneumatic tool (hammer or pick) for mines	20376
Mine Winch for 3000 and 5000 kg lifting power	21134
Miner's mittens	23305/6
Outer bearing of trough tipping wagon, 2.5 cu m capacity	5984,Bl.1,2
Rope sheaves for maximum 5 ton load	21153,Bl.1
Rope sheaves for maximum 22 ton load	21153,Bl.2
Hoisting buckets	21181
Angle bearing and bracket	22216
Rope girder for maximum 5 ton load	21194
Lifting buckets for equipment	21182
Lifting buckets for mortar	21183
Shaft construction. Timbering. Spacing	21537
Shaft casing	21191
Rubber conveyor belt	22102,Bl.2
General rules for construction of mining conveyors	4118
Shaft-Sinking Pipe, Riveted	4928/9
Clamp Joints for Steel Vault Arches	21542/3
Simple Switch for 600 mm Gage Mining Railroad	20516, Bl.2

629.11 Land Vehicles Transport Engineering

Germany	*DIN*
Tires for motorcycles and side cars	7800
Method of stamping firm's name and size data on rims and wheels	7829
Five-pole receptacle and plug for trucks and buses	72576,Bl.1,2
Piston pins for Diesel engines	73122
Control handle of motorcycles	71903,Bl.1
Tubing for central lubricating system of motor vehicles	71435
Compressed air cylinder for brakes	74282,Bl.1
Jack	76023
Speedometer	75525

Poland	*PN*
Bicycles. Cranking mechanism. Assembly	S-46080
Bicycle right-hand crank	S-46088
All-purpose wrench for bicycles	S-46132
High-tension connection socket for ignition coil and distributors	S-76054
Automobile batteries. Terminals	S-90016
6v batteries for motorcycles	S-90040

Sweden	*SIS*
Bicycles. General reference table of component parts	1305
Frame bushing of saddle pillar	1402

629.113 Motor Vehicles, etc.

Finland	*SFS*
National Identification plates	R 000-01
License plates for automobiles	R 100-01
License plates for motorcycles	R 200-01
"High frequency" automobile horn	R 143-06
Automobile bumpers	R 144-03

Germany	*DIN*
Piston rings and oil rings for different types of internal combustion motors	73102,Bl.3, 73103,Bl.3, 73104,Bl.2.3, 73105
Piston pin for "Otto" motors	73121
Different command levers and hand grips of motorcycles	71902/3
Compressed air cylinder for pneumatic brakes	74281

629.12 Ships and Shipbuilding

France	*NF*
Wind scoops. General description	J 46-100
Three types of rotating wind scoops	J 46-110,-112,-114
Non-rotating wind scoops	J 46-116
Removable and variable height wind scoops	J46-120
Five standards for details of wind scoops	J 46-122,-124,-126,-128,-130
Six standards for mechanical remote control of rotating wind scoops	J 46-140,-142,-144,-146,-148,-150
Pivot mounted, remote controlled wind scoop	J 46-162,-164
Cowls, orientable and fixed for foul-air evacuating pipes	J 46-210,-212,-214

Netherlands	*N*
Ships propellers: allowable deviations	974

Spain	*UNE*
Anchor, type A, without stock, assembly and details	27183-h.1-3

629.13 Aircraft Engineering

Netherlands	*N*
Aircraft hinges, single-flange	

and double-flange plates and hinge pins | V-1874

631 Agricultural in General

Chile	*INDITECNOR*
Manure. General terminology	2.21-3
Manure. Classification	2.21-4
Finland	*SFS*
Soil improvement with lime and similar raw chemicals	U 44-001
Germany	*DIN*
Draught-hook	11615
Fertilizer spreading hand trowel	11585
Spain	*UNE*
Cocoa	34002
United Kingdom	*BS*
Attachment of mounted implements to agricultural wheeled tractors	1841:1951

672 Articles of Iron and Steel

Denmark	*DS*
Round cans for preserved food	362
France	*NF*
Galvanized sterilizer for home canning	D23-103
Germany	*DIN*
Lids and bottoms for cans for preserved food	2023
Cans for preserved fruits and vegetables	2011
Poland	*PN*
Shoemaker tools	0-54019,-54024/7,-54032/3
Knives for peeling vegetables	A-55000
Table knives	A-55006
Kitchen knives, two types	A-55010,-55011
Three types of butcher's knives	A-63021,-63022,-63023
Butchering stiletto	A-63025
Heavy kitchen knives	A-63026
Bristle scraping knives	A-63027
Knives for canned ham	A-63028
Aluminum canteen	M-77027
Rumania	*STAS*
Plasterer's shovel	1757
Chain slings	1790
Oxen shoes, unfinished	1391
Welded chain links for winches	1791
Sweden	*SIS*
Six standards for different form tins for preserved food	R 71 01 01 thru R 71 01 06
Round cans with press-on lids	71 01 20, 71 01 21,
Collapsible tubes with screw caps	71 01 31
Five standards for different types of chains	1502-1506

674 Wood Industry

Canada	*CSA*
Specifications for hardwood plywood	O 115-1952
Denmark	*DS*
Five types of fruit packing boxes	740 thru 744
France	*NF*
Method to estimate the volume of lumber from growing trees	B 53-017
Wooden step ladders	B 55-006
Germany	*DIN*
Testing of different kinds of glues for wood	53252
Barrels for butter in bulk, 50 kg capacity	10070
Tubs for butter, 25 kg capacity	10072
Boxes for printed butter, 25 kg capacity	10047
India	*IS*
Specification for commercial and moistureproof plywood	303
Mexico	*DGN*
Wooden barrels for pulque	R 17-1951
Wooden crates for fruit transportation	G 5-1951
Wooden railway sleepers	G 2
Netherlands	*N*
Double extension ladder with ropes	937
Four types of single and double ladders	1731-1734
Poland	*PN*
Crates for eggs	D-79626
Crates and set of shooks for game fowl	D-79649
Semi-finished beechwood parts for furniture making	
Semi-finished bobbins for textile machines	D-94009
Bookcase, wooden, for the office	F-78032
Quality requirements for material for wooden boxes	D-79601
Wood wool	D-94000
Pine wood sleepers, specifications	D-95006
Beech lumber	D-96006
Maple and plane tree lumber	D-96009
Rumania	*STAS*
Wooden barrels for salt fish	1649
Timber cleavage test	1651
Cellulose sulphite for viscose	1745
Wooden sleepers for gantries	1838
Wooden barrels	1648
Plywood. Adhesion test	1809
Plywood. Determination of weight per sq m, of apparent specific gravity and of moisture content	1810
South Africa	*SABS*
Creosoted wooden telephone, telegraph, electric light and power transmission poles	339-1951
Eucalyptus (gum) wood blocks for floors	340-1951
United Kingdom	*BS*
Wood chip boards, wood waste boards and similar boards	1811:1952
Grading and sizing of softwood flooring	1297:1952
Union of Soviet Socialist Republics	*GOST*
Sawmill logs of coniferous species	1047

675 Leather Industry

Mexico	*DGN*
Tanned hides, plain	I 6-1951

676 Paper Industry

France	*NF*
Paper used for manufacturing paraffin-treated liquid containers	Q 15-004
Toilet paper	Q 34-001
Nine revised standards for specifications of different grades of paper used for typewriting, letter-heads, envelopes, library cards, etc.	Q 11-001 thru Q 11-009
Four revised standards for different packaging papers	Q 12-003,-005,-006,-007
Two standards for paper used in manufacturing electrolytic and static capacitors	Q 13-002,-003
Paper for carbon copies (tissue paper); base paper for manufacturing carbon paper; standards for abrasive paper; coated papers; photographic papers; wall papers; gummed paper; stamps	Q 15-001; Q 15-002; Q 15-003; Q 15-005 thru Q 15-009
Netherlands	*N*
Testing of Paper	
Determination of breaking strength, elongation, etc	1249
Determination of machine direction and cross-direction	1761
Two methods	1764, 1765
General test conditions and methods	1108
Basic weight of paper	1109
Determination of thickness and bulk	1110
Poland	*PN*
Book cover papers. Specifications	P-95802
United Kingdom	*BS*
Vegetable parchment	1820:1952
Union of Soviet Socialist Republics	*GOST*
Pasteboard-making machines. General data on types and sizes	5907
Paper bags, plain	2227
Paper stock for paper bags	2228

677 Textile Industry

Germany	*DIN*
Sequence of Operations in Wool Washing and Wool Carding Shops	60415
Sequence of Operations in Worsted Yarn Shop	60416
Waste, Washed	61650
Yarn and Threads. Symbols and twist direction indication	60900
Artificial silk	60700
India	*IS*
Cotton twills	178
Cotton mulls and nainsook	186
Longcloth	187
Cotton poplins	188
Method for determination of weight per square yard (or meter) and weight per linear yard (or meter) of cotton fabrics	242
Sweden	*SIS*
Determination of fineness of wool and animal hair fibers	65 00 04
Determination of water repelling quality of textiles	65 00 10
Determination of twist in yarn	65 00 11
Quantitative chemical fiber analysis	65 00 12
Determination of the resistance to light of dyes	65 00 13
Determination of crocking	65 00 14
Determination of counts in textile fabrics	65 00 15
Determination of permeability of air in textile fabrics	65 00 16

United Kingdom	*BS*
Designation of the structure of single plied and cabled yarns	946:1952
Yarn count systems and conversions	947:1952

677.05 Textile Machinery

Germany	*DIN*
Change wheel for mechanical loom	64530
Pair of gear wheels for the jute loom	64525
Weaver's reeds	64600
Cylindrical spinning cans	64120
Looms, nomenclature of parts	63000
Shuttles	64630

India	*IS*
Code for the manufacture of pickers	270

Mexico	*DGN*
Leather belts for looms	I 7-1951

Poland	*PN*
Rubber washer for filter tube	P-62002
Gage for taper bobbin tubes	P-62052
Square-headed cover bolts	P-63501
Roller chain for carding machine	P-63502
Swivel bearing bracket and bushing	P-63779/80
Collar for swivel bearing housing	P-63805
Cylindrical paper bobbin tube	P-63850
Double spring beams	P-63851
Wet spindle bearing cup	P-64615
Drafting apparatus' serrations	P-64709
Wooden warp beam for silk looms	P-65707
Different roller beams and details	P-65821,-65825
Width of loom	P-66025
Filters and their details for spinning artificial silk	P-62000,-62001,-62003
Paper cone	P-62050
Thirteen standards for wet spinning spindles, assembly and details	P-64610,-64611,-64613,-64614,-64617 thru 64625

Switzerland	*SNV*
Mechanical chain-breaker blade and bar	32230, 32231

Union of Soviet Socialist Republics	*GOST*
Table of standard width of automatic looms	5951

677.72 Metal Cables, Wire Ropes

Austria	*ÖNORM*
Wire ropes for elevators	M 9506
Wire ropes for cranes and other hoisting machines	M 9537/8
Three types of plain lifting wire ropes	M 9530-9532
Two types of towing wire ropes	M 9533-9534

678 Rubber Industry

France	*NF*
Determination of solid particles content in latex	T 42-003

Germany	*DIN*
Testing of rubber	53503; 53507; 53550

Netherlands	*N*
Rubber packing rings for glass jars	1454

United Kingdom	*BS*
Method of testing raw rubber and unvulcanized compounded rubber: Part I: Sampling	1673:pt.1:1952
Rubber conveyor and elevator belting	490:1951
Rubber mats for electrical purposes	921:1952

Union of Soviet Socialist Republics	*GOST*
Rubber-lined rubberized pressure hoses used in plastering work	6044

683 Hardware, Ironmongery

Austria	*ÖNORM*
Counter-flap hinges for windows	B 5344

France	*NF*
Various house locks	PN P 26-301
Blocks of safety locks for a building	PN P 26-302
Window fastenings (cremone bolts)	PN P 26-305

India	*IS*
Parliament hinges	362
Padlocks	275
Sliding door bolts for use with padlocks	281

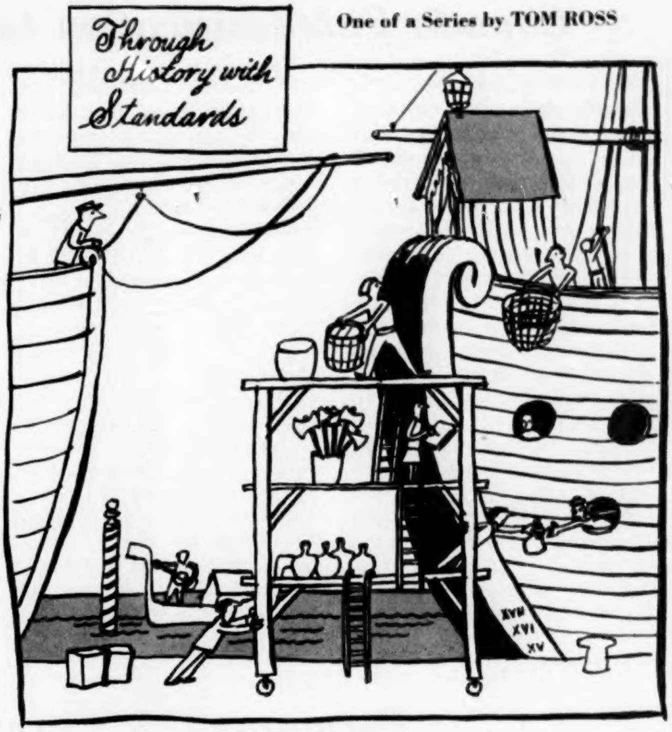
Norway	*NS*
Hinges used in building trade	800 thru 806

Poland	*PN*
Key for window latches	B-94012
Window latch striking plate	B-94014
Hinges	B-94051, 94053
Window locks	B-94099
Window fastener hooks	B-94106
Casement stays, adjustable	B-94155

Rumania	*STAS*
Window fastenings, cremone bolt type	1548

Sweden	*SIS*
Door locks	60 00 20
Door handles with and without collar	60 00 51 thru 60 00 54
Door handle escutcheons and plates	60 00 69 thru 60 00 71

One of a Series by TOM ROSS



Venice in 1436: An Assembly Line for Ships

Venice, the world's first modern state, apparently created the first true assembly line.

Throughout the 15th and 16th centuries, a Venetian water basin called the Arsenal, which employed 16,000 men and manufactured everything from cannon to nails, was the world's largest industrial plant. There Venice built a standardized trading vessel which could be quickly converted into a galley of war.

When finished, the galley was towed slowly down a canal, and as it passed, workmen reached out of windows on either side and loaded on its equipment. When the vessel reached the end of the street, everything necessary was on board, including cordage, oars, armament, food, and a full complement of men.

"In this manner," wrote a Spanish visitor in 1436, "there came out ten galleys fully armed, between the hours of three and nine." In 1570, during the war with the Turks, the Arsenal turned out a hundred fully outfitted galleys in a hundred days.

(Source: *Life's Picture History of Western Man*)

Canada Puts Unification into Practice

The Canadian Standards Association calls attention to a number of steps it has taken to put into effect the A-B-C unification program. It has organized committees, including representatives of industry, armed services, and scientific organizations as a means of coordinating Canadian opinions and to cooperate with similar groups under the procedures of the British Standards Institution and the American Standards Association. The following standards and pamphlets published by CSA embody the unification principles:

Canadian Standard, Unified and American Screw Threads, B1.1-1949, describes unified screw thread form and gives detailed dimensions of various classes, series, and sizes of screw threads.

CSA Manual of Unified Screw Threads for Shop and Drafting Room makes available in condensed form details of the Unified Screw Thread which are required for every day use in the workshop and drafting room. It is particularly designed for use by draftsmen and students.

Established Lists of Machine Screws, Stove Bolts, and Nuts, B29-1951, includes tables of values of the thread elements in the numbered series of screws below 1/4 inch nominal diameter, on the basis of the Unified Thread formulas.

Bolts, Cap Screws, Set Screws, Studs and Nuts, B33.1-1950, recognizes the Unified Screw Thread but omits classes of threads, tolerances, and fits which may be found in B1.1-1949.

Mechanical Engineering Drawings, B78.1T-1952, was issued as a tentative standard as a step toward unification of drawing practices with those in effect in the United Kingdom and the U. S. "Its application in conjunction with other ABC standards embodying unification of engineering principles and practices is one of the fundamentals leading to functional interchangeability of machine components," CSA comments. "Its acceptance by industry will be an important step in meeting the demands of interchangeability."

Limits and Fits for Engineering and Manufacturing, Part I, B97-1948, is identical in principle with similar specifications approved by the British Standards Institution and the American Standards Association.

Limits and Fits, Part II, B97, is under development and will represent unification of principles related to "fits," such as, length of engagement, bearing load, speed, lubrication, surface finish, materials, methods of inspection.

Permanent Conference Will Work on A-B-C Standards

Agreement has been reached by the United States, Canadian, and British technicians to set up a permanent organization to work on unification of engineering standards. This action was taken at an A-B-C conference in June which met at the invitation of Dr John R. Steelman, Acting Director of Defense Mobilization. Howard Coonley, Director of Conservation, Defense Production Administration, has been named permanent chairman of the new American-British-Canadian Conference on Standards.

The June conference, held with the cooperation of the American Standards Association and the American Society of Mechanical Engineers, reached general accord on all major items and named permanent committees to study details and report back to the next meeting of the conference. The next meeting has been set for October 14.

Both Armed Services and industrial representatives of sectional committees on screw threads, pipe and fittings, drafting practice, gas cylinders, and fits and tolerances took part in the conference with representatives of the British Standards Institution, the Canadian Standards Association, and the U.S. Government.

ASME, which provided secretarial services during the conference, comments on the meetings as follows:

"The agenda was a full one—complicated and technical—the keynote of the meeting being the discussion of down-to-earth technical standardization problems. Perhaps the most important part of the program was the matter of mutually agreed standards for drawing and drafting practice.

"Actually the conference aimed to re-establish the necessity for A-B-C agreement on basic engineering standards; to see whether any improvements in existing machinery for reaching agreement on unified standards are desirable and practical; to review the program initiated at the Ottawa Conference in 1945, noting the progress since that conference and to redefine the balance of the program; to see whether additional items should be placed on the program; and to consider specifically and technically the following subjects: (*a*) acme threads, (*b*) buttress threads, (*c*) pipe threads, (*d*) threads for gas cylinders, (*e*) limits and fits, and (*f*) drawing and drafting room practice.

"The minutes of the conference are being prepared for publication and the release date will be announced.

Declaring that this standardization program has the government's enthusiastic support, Dr Steelman said,

"We feel the entire effort is of tremendous importance to defense and conservation of manpower."

Among those who took part in the conference were J. R. Townsend, Assistant to the Director, ODM, and chairman of ASA's Standards Council, representing Dr Steelman; Stanley J. Harley, British Standards Institution, chairman of the British delegation; and James G. Morrow, Canadian Standards Association, head of the Canadian delegation. Rear Admiral J. W. Fowler represented the U.S. Department of Defense, and Dr E. C. Crittenden represented Secretary of Commerce, Sawyer. The American delegation also included representation from Sectional Committees B1, B2, B4, B57, and Y14.

Castings Specifications Summarized

Standard specifications for more than 70 designated classes of steel castings are incorporated in a comprehensive new summary chart compiled by Steel Founders' Society of America.

Intended to serve as a reference aid to design engineers and purchasing department engineering staffs, the newly prepared chart covers pertinent data on virtually all general engineering types of steel castings together with recently adopted specifications and some revisions of previous specification standards.

Essential information included in the simplified tabular listings includes types of heat treatment, chemical compositions and mechanical properties of varying specifications, with detailed ready-reference data on specific tensile strength, yield point, elongation, reduction of area, bend, impact hardness, and other indicated test procedures.

Special attention is devoted to some miscellaneous requirements of radiographic, magnetic particle, hydrostatic, and destructive testing, and welding, where indicated.

Write to F. Kermit Donaldson, executive vice president, Steel Founders' Society of America, 920 Midland Building, Cleveland 15, Ohio, for copies.

Gaillard Seminar on Industrial Standardization

Sixteen men attended the five-day, June, 1952, private seminar on Industrial Standardization held in New York by Dr John Gaillard, mechanical engineer on the ASA staff and lecturer at Columbia University. Fifteen conferees represented industrial firms and one conferee, the U.S. Army Transportation Corps. Companies represented for the first time were: Bendix Products Division, Bendix Aviation Corporation; Cushing and Nevell; General Electric Company; Robins Conveyors, Division of Hewitt-Robins, Inc; Sheffield Corporation; and Spencer Thermostat Division, Metals and Controls Corporation.

The following organizations had been represented at one or more previous Gaillard Seminars: Aluminum Company of America; Dumore Company; International Business Machines Corporation; Saco-Lowell Shops; Sylvania Electric Products, Inc; and U.S. Army Transportation Corps.

The next Gaillard Seminar will be held January 26 through 30, 1953, in the Engineering Societies Building, New York City. Those wishing to make advance reservations are asked to call Dr Gaillard at the ASA office, MUrray Hill 3-3058, or to write him at his home address, 400 West 118 Street, New York 27, N. Y.

This Month's Standards Personality...

George W. Diggles has helped maintain quality and interchangeability of electric lamps for many years. In 1920 he was placed in charge of lamp inspection at the Electrical Testing Laboratories when ETL undertook inspection of lamp quality for the Mazda lamp manufacturers. Under this program, Mr Diggles was responsible for a continuous check of quality at 20 plants producing incandescent lamps. These inspections have been carried out throughout the last 32 years.

Since 1949 Mr Diggles has been chairman of ASA Committee C78, which develops and maintains standard dimensions and specifications for lamps on a national basis.

His interest in statistical methods of quality control goes back to 1915. At that time he was in charge of a study of the theory of probabilities as applied to errors in connection with ETL's large-scale inspection of incandescent lamps in factories and in the field. The study was applied to errors involved in findings resulting from samplings of 5, 10, and 20 percent. In this work a statistical method was developed. The story of this early application of a statistical sampling method was told by Mr Diggles at the Annual Convention of the American Society of Quality Control May 24, 1952.

Mr Diggles retired from active work at the Electrical Testing Laboratories and from chairmanship of Committee C78 as of July 31. He will, however, retain his connection as a Director and Consultant of ETL.

AMERICAN STANDARDS

Status as of July 22, 1952

Standards Council — Approval by Standards Council is final approval as American Standard; usually requires 4 weeks

Board of Review — Acts for Standards Council and gives final approval as American Standard; action usually requires 2 weeks

Correlating Committees — Approve standards to send to Standards Council or Board of Review for final action; approval usually takes 4 weeks

Building

American Standards Approved—

Non-Slip Oxychloride Composition Flooring and Its Installation, Specification for, A88.5-1952

Terrazzo Oxychloride Composition Flooring and Its Installation, Specification for, A88.6-1952

Industrial Granolithic Oxychloride Composition Flooring and Its Installation, Specification for A88.7-1952

Oxycement Underlayment and Its Installation, Specification for A88.8-1952

General Purpose Flooring and Its Installation, Specification for, A-88.2-1952 (Revision of A88.2-1951)

Heavy Duty Flooring and Its Installation, Specification for, A88.3-1952 (Revision of A88.3-1951)

Base Coat Flooring and Its Installation, A88.4-1952 (Revision of A88.4-1951)
Sponsors: American Society for Testing Materials; National Bureau of Standards

Building Code Requirements for Structural Steel (Riveted, Bolted, or Welded Construction), A57.1-1952 (Revision of A57.1-1943)
Sponsor: American Society of Civil Engineers; American Institute of Steel Construction

Building Code Requirements for Excavations and Foundations, A56.1-1952
Sponsor: American Society of Civil Engineers

Sand-Lime Building Brick, Specifications for, ASTM C73-51; ASA A78.1-1952 (Revision of ASTM C73-39; ASA A78.1-1942)
Sponsor: American Society for Testing Materials

In Correlating Committee—

Seamless Copper Pipe, Standard Sizes, Specifications for, ASTM B42-51; ASA H26.1 (Revision of ASTM B42-49; ASA H26.1-1949)

Seamless Red Brass Pipe, Standard Sizes, Specifications for, ASTM B43-51; ASA H27.1 (Revision of ASTM B43-49; ASA H27.1-1949)

Seamless Copper Water Tube, Specifications for, ASTM B88-51; H23.1 (Revision of ASTM B88-50; ASA H23.1-1949)

Copper-Silicon Alloy Wire for General Purposes, Specifications for, ASTM B99-51; ASA H30.1 (Revision of ASTM B99-49; ASA H30.1-1949)

Copper and Copper-Base Alloy Forging Rods, Bars, and Shapes, Specifications for, ASTM B124-51; ASA H7.1 (Revision of ASTM B124-49; ASA H7.1-1949)

Brass Wire, Specifications for, ASTM B134-51; ASA H32.1 (Revision of ASTM B134-50; ASA H32.1-1951)

Leaded Red Brass (Hardware Bronze) Rods, Bars, and Shapes, Specifications for, ASTM B140-51; ASA H33.1 (Revision of ASTM B140-50; ASA H33.1-1951)
Sponsor: American Society for Testing Materials

Short-Body Cast-Iron Fittings, 3 inch to 12 inch, for 250 psi Water Pressure Plus Water Hammer, Specifications for, A21.10
Sponsors: American Gas Association; American Society for Testing Materials; American Water Works Association; New England Water Works Association.

Chemicals

In Correlating Committee—

Spirit of Turpentine, Specifications for, ASTM D13-51; ASA K32 (Revision of ASTM D13-34; ASA K32-1937)
Sponsor: American Society for Testing Materials

Consumer

American Standards Approved—

Standards for Rayon Fabrics, L22-1952
Sponsor: National Retail Dry Goods Association

Gas Burning Appliances

In Correlating Committee—

Approval Requirements for Domestic Gas Ranges, Z21.1; Z21.1a (Revision of Z21.1-1948; Z21.1a-1949)

Listing Requirements for Automatic Valves for Gas Appliances, Z21.21 (Revision of Z21.21-1948)

Approval Requirements for Gas Water Heaters, Z21.10b (Addenda to Z21.10-1950 and Z21.10a-1951)

Approval Requirements for Central Gas Heating Appliances, Z21.13.2a (Addenda to Z21.13.2-1951)
Sponsor: American Gas Association

Reaffirmation Recommended—

American Standard Listing Requirements on Gas Hose for Portable Gas Appliances, Z21.2-1949

American Standard Approval Requirements for Domestic Gas-Fired Incinerators, Z21.6-1949

American Standard Requirements for Installation of Domestic Gas Conversion Burners, Z21.8-1948

American Standard Approval Requirements for Hot Plates and Laundry Stoves, Z21.9-1948, and Z21.9a-1949

American Standard Listing Requirements for Gas Valves, Z21.15-1944, and Z21.15a-1949

American Standard Listing Requirements for Domestic Gas Conversion Burners, Z21.17-1948

American Standard Approval Requirements for Dual Oven Type Combination Gas Ranges, Z21.37-1948

Electrical

American Standard Just Published—

Tentative Methods of Test for Electrical Resistance of Insulating Materials, ASTM D257-49T; ASA C59.3-1952 $0.25

American Standards Approved—

Rated Control Voltage and Their Ranges, for Alternating Current Power Circuit Breakers (Revision of C37.8-1945), C37.8
Sponsor: Electrical Standards Committee

Tinned Soft or Annealed Copper Wire for Electrical Purposes (Revision of ASTM B33-50; ASA C7.4-1951) ASTM B33-51;) ASA C7.4-1952

Soft Rectangular and Square Bare Wire for Electrical Conductors (Revision of ASTM B48-49; ASA C7.9-1951) ASTM B48-51; ASA C7.9-1952

Rope-Lay-Stranded Copper Conductors Having Bunch-Stranded Members for Electrical Conductors (Revision of ASTM B172-50T; ASA C7.12-1951) ASTM B172-51T; ASA C7.12-1952

Rope-Lay-Stranded Copper Conductors Having Concentric and Stranded Members for Electrical Conductors (Revision of ASTM B173-50T; ASA C7.13-1951) ASTM B173-51T; ASA C7.13-1952

Bunch-Stranded Copper Conductors for Electrical Conductors (Revision of ASTM B174-50T; ASA C7.14-1951) ASTM B174-51T; ASA C7.14-1952
Sponsor: American Society for Testing Materials

In Correlating Committee—

Pure-Tone Audiometers for Screening Purposes, Z24.12
Sponsor: Acoustical Society of America

Power-Operated Radio Receiving Appliances, C65 (Revision of C65.1-1942)
Sponsor: Underwriters' Laboratories

Interrupting Rating Factors for Reclosing Service on Power Circuit Breakers, C37.7 (Revision of C37.7-1945)

Guide Specifications for A-C Power Circuit Breakers, C37.12
Sponsor: Electrical Standards Committee

Standards Submitted—

Rubber Insulating Tape, Specifications for, ASTM D119-48T; ASA C59.6 (Revision of ASTM D119-38; ASA C59.6-1939, R 1945)

Dielectric Strength of Insulating Oil of Petroleum Origin, Test for, ASTM D877-49; ASA C59.16

Vulcanized Fibre, C59.20 (Revision of NEMA VU1-1949; ASA C59.20-1949)

Laminated Thermosetting Products, C59.16 (Revision of NEMA 46-118; ASA C59.16-1951)
Sponsor: American Society for Testing Materials

Mechanical

American Standards Just Published—

Acme Screw Threads, B1.5-1952 $2.25
Sponsors: Society of Automotive Engineers; The American Society of Mechanical Engineers

Stub Acme Screw Threads, B1.8-1952 $1.25
Sponsors: Society of Automotive Engineers; The American Society of Mechanical Engineers

In Board of Review—

Mounting Dimensions of Lubricating and Coolant Pumps for Machine Tools, B5.28-1952
Sponsors: American Society of Mechanical Engineers; Metal Cutting Tool Institute; National Machine Tool Builders Association; Society of Automotive Engineers

In Correlating Committee—

Preferred Thicknesses for Uncoated Thin Flat Metals (Under 0.250 In.), B32.1 (Revision of B32.1-1941)
Sponsors: American Society of Mechanical Engineers; Society of Automotive Engineers

Free Cutting Brass Rod and Bar for Use in Screw Machines, ASTM B16-51; ASA H8.1 (Revision of ASTM B16-49; ASA H8.1-1949)
Sponsor: American Society for Testing Materials

Office Standards

In Board of Review—

Provisions for Installation of Telephone Equipment on Desks, X2.1.2
Sponsor: National Office Management Association

Optics

In Correlating Committee—

Nomenclature for Radiometry and Photometry, Z58.1.1
Sponsor: Optical Society of America

Photography

In Correlating Committee—

Spectral Densities of Three-Component Subtractive Color Flms, PH2
Sponsor: Photographic Standards (Correlating) Committee

Safety

In Correlating Committee—

Safety Code for Mechanical Power-Transmission Apparatus (Revision of B15-1927)
Sponsors: Association of Casualty and Surety Companies, Accident Prevention Department; International Association of Governmental Labor Officials

Practice for Industrial Lighting, A11.1 (Revision of A11-1942)
Sponsor: Illuminating Engineering Society

What's New on American Standard Projects

Electric Discharge Lamps and Ballasts—

A Joint Committee of the sectional committees on lamps, C78, and on lamp ballasts, C82, has been organized to bring about coordination and prevent conflicts in standards being developed on these subjects. A task group has been given the immediate job of solving the problem of measurement that has been before the committee and of obtaining curves of electrical characteristics of lamps plotted against reference ballast impedance. The committee is also studying the International Specification for Ballasts for Fluorescent Lamps in relation to the proposed standards being developed by Sectional Committee C82.

Electrical Measuring Instruments, C39—

Sponsor: Electrical Standards Committee

Work has been started by a subgroup on standards for indirect-acting electrical recording instruments. Manufacturers concerned with new applications of recording instruments and faced with the problem of translating quantities that cannot be directly measured into the quantities they want to use in their work have solved their problem in different ways, it was reported. The new work is intended to bring about standard methods before a variety of techniques have become too strongly entrenched in practice. Indirect-acting electrical recording instruments are used in a wide variety of industrial and governmental organizations. One of the large users is the Atomic Energy Commission. D. A. Young, Westinghouse Electric Corporation, is chairman of Subgroup 3, Subcommittee C39-2.

Drawings and Drafting Practice, Y14—

Sponsors: American Society of Mechanical Engineers; American Society of Engineering Education.

Section 1—Size and Format, one of the sections of the proposed American Drafting Standards Manual, which is being prepared by ASA Sectional Committee on Drawings and Drafting Practice, Y14, is now available and is being distributed to industry for criticism and comment.

The manual when completed will cover the standardization of all aspects of engineering drawing and drafting practice.

Anyone wishing to obtain copies of Section 1 may address a request to The American Society of Mechanical Engineers, 29 West 39th Street, New York 18, N. Y., Attention: D. M. Shackelford, Standards Administrator.

Small Tools and Machine Tool Elements, B5—

Sponsors: Metal Cutting Tool Institute; Society of Automotive Engineers; National Machine Tool Builders' Association; the American Society of Mechanical Engineers

Life Tests for Single-Point Tools of Sintered Carbide — A proposed American Standard is now being distributed for comment. It discusses in general the type of wear that can be expected as a result of different cutting conditions, the test procedures, and the factors that must be carefully controlled in order to obtain comparable test results. The test procedure for determining tool life is quite similar to that given for tools of high-speed steel and cast nonferrous steel. However, carbide tools are not run to complete tool breakdown. Practice is to run to tool until the wear on the flank averages about 0.030 in. as measured from the original cutting edge. The tool is then

removed and reground. Numerous illustrations show how different tools wear under this test. In addition to discussions of the tests themselves, the proposed standard includes suggestions for the tools to be tested, how to prepare the tools for the tests, and the relationship between tool wear and cutting time.

Single Point Tools and Tool Posts, Section 6—This proposed new section to the American Standard Single Point Tools and Tool Posts, B5.20-1950, has been presented to Sectional Committee B5 for approval. It will be printed separately as a supplement to American Standard B5.20-1950. The addition consists of recommendations for standard sizes of solid sintered-carbide bits and holders for square, triangular, and round sectioned bits or inserts to be clamped in tool holders tangentially.

Copies of these proposals can be obtained by writing D. M. Shackelford, Standards Administrator, The American Society of Mechanical Engineers, 29 West 39th Street, New York 18, N. Y.

Code for Pressure Piping, B31—

Sponsor: American Society of Mechanical Engineers.

Pending revision of the Code for Pressure Piping, ASA B31.1-1951, the sectional committee has recommended that ASME, as sponsor, publish selected interpretations so that industry may take immediate advantage of corresponding proposed revisions. Case Nos. 10, 11, and 12 are published herewith as interim actions of Sectional Committee B31 of the Code for Pressure Piping. They will not constitute a part of the Code until formal action has been taken by ASME and by the American Standards Association on a revision of the Code. However, they may be used as representing the considered opinion of the committee.

Case No. 10

Inquiry: May blind flanges be made from steel-plate material as well as from forged or cast materials now permitted by the Code?

Reply: It is the opinion of the committee that blind flanges may be fabricated directly from plate materials with mechanical properties equal to or better than the permissible forged materials. Flanges on which welding may be required should also be of weldable quality.

Case No. 11

Inquiry: May austenitic chromium-nickel alloy steels which are stabilized with columbium plus tantalum be used under Code rules which are applicable to the use of stainless steel Types 309 Cb, 316 Cb, and 347?

Reply: It is the opinion of the committee that austenitic chromium-nickel alloy steels, which are stabilized with columbium plus tantalum instead of columbium only, may be used under Code rules which are applicable to the use of Types 309 Cb, 316 Cb, and 347 provided the requirements of the emergency alternate provisions of ASTM Specification A312 are met, except that the requirements for columbium contents shall be as follows:

Columbium—determination not required

Columbium plus tantalum—1.25 percent max

8 × the carbon content, min

Until such time as the NPA regulations are cancelled, these steels stabilized with columbium alone may be used with a minimum columbium content of 8 times the carbon content. Working stresses shall be the same as those listed for the standard grades stabilized with columbium alone.

Case No. 12

Inquiry: Pending issuance of emergency alternate specifications by ASTM to provide for conservation of critical alloying material, may the molybdenum content of specifications referred to in the Code be lowered by 0.05 percent?

Reply: It is the opinion of the committee that the intent of the Code will be met if specifications with a molybdenum range of 0.45 to 0.65 percent are reduced to 0.40 to 0.60 percent, and specifications with a range of 0.90 to 1.10 per cent are reduced to 0.80 to 1.00 percent. The allowable stresses assigned to these respective grades need not be reduced.

New Subcommittee to Develop Safety Code for Gas Piping—

At a three-day meeting of a newly organized subcommittee held in Chicago recently, work was begun on the formulation of a safety code covering the material, design, fabrication, installation, testing, and operation of gas pipelines and related facilities.

Announcement was made in June that F. A. Hough, vice-president, Southern Counties Gas Company of California, Los Angeles, would head a new national committee concerned with gas transmission and distribution safety. The committee, known as Subcommittee No. 8 on Gas Transmission and Distribution Piping, of Sectional Committee on Code for Pressure Piping, B31, is sponsored by the American Society of Mechanical Engineers, under the procedures of the American Standards Association, and has the backing of the American Gas Association. Mr Hough serves as chairman because of his recent appointment as representative of AGA's Natural Gas Department on sectional committee B31.

Subcommittee No. 8 will use as its starting point a forthcoming document known as Section 8, on Gas Pipeline and Distribution Systems, which is a consolidation of those parts of the Code for Pressure Piping B31 pertaining to gas piping. The subcommittee will revise and expand this section where necessary, and, upon its approval by ASA, will publish it as a separate document known as "Section 8, Code for Pressure Piping B31.1." It will also be included as the last section in future editions of the B31 Code. The Chicago meeting was devoted to full discussion of pipeline problems and a careful review of existing requirements to determine to what extent the forthcoming Section 8 requires modification or expansion to reflect modern materials and technology.

AGA took a leading part in the preliminaries which preceded the start of the actual work on the revision of the code. In addition to naming Mr Hough as its representative on Sectional Committee B31, AGA had numerous conferences with key personnel of the industry. A preliminary meeting was held at the Natural Gas Department Spring Meeting at Los Angeles in May to organize a program before the meeting of the entire subcommittee No. 8 at Chicago.

Although the gas industry has a long and enviable safety record, in view of recent technological developments it is believed that additional steps can be taken to assure safe construction and operation of its facilities. It is believed also that the experts comprising the committee will prepare a code having public safety as its major objective and that public confidence in the movement will be merited. Establishment of the code as an American Standard will assure its impartiality and objectivity.

Subcommittee No. 8 is composed of 52 representatives of gas transmission and gas distribution companies; pipe companies; valve and fitting companies; independent research groups; technical universities; consulting engineers; and government agencies. It will review specifications and codes already formulated or in the process of preparation by other agencies including private research groups, governmental agencies, or AGA committees. Where present specifications appear inadequate, or where none exist, it will draw upon the resources of the many technical groups participating in this work.

Although preparations of American Standards sometimes take several years, Subcommittee No. 8 hopes to speed completion and publication of the Code on Gas Transmission and Distribution Piping through an accelerated program. Its officers and members plan to devote extra time to committee work. A full-time assistant will be employed, and frequent meetings will be called to review, consolidate, and approve the material prepared by subgroups.

In addition to Chairman Hough, officers of Subcommittee No. 8 are: Walter W. Davidson, Transcontinental Gas Pipe Line Corporation, Houston, vice-chairman, and chairman, Subgroup on Construction and Operating; C. F. DeMey, Columbia Gas System Service Corporation, New York, vice-chairman, and chairman, Subgroup on Pipe; C. T. Schweitzer, Southern California Gas Company, Los Angeles, secretary, and chairman pro tem, Subgroup on Design Stresses; B. T. Mast, Tennessee Gas Transmission Company, Houston, chairman, Subgroup on Compressor Stations; and Frank S. G. Williams, Taylor Forge and Pipe Works Company, New York, chairman of Subgroup on Fabricating Details and Mechanical Design. Mr Williams also is chairman of the Sectional Committee, on the Code for Pressure Piping, B31, of which Subcommittee No. 8 is a part.

Subcommittee No. 8 will hold its next meeting at the Cosmopolitan Hotel, Denver, Colorado, on August 12, 13 and 14, 1952.

Book Reviews

ASTM Specifications for Steel Piping Materials. (American Society for Testing Materials, 1916 Race Street, Philadelphia 3, Pa. $3.50 each.)

The 1952 edition of this compilation sponsored by ASTM Committee A-1 on Steel contains in their latest approved form (as of late February) the 56 widely used ASTM specifications for carbon-steel and alloy-steel pipe and tubing, including stainless.

Materials covered include: still tubes for refinery service; heat exchanger and condenser tubes; boiler, superheater, and miscellaneous tubes. To make the volume more complete there are also included specifications for the following materials used in pipe and related installations: castings; forgings and welding fittings; bolts and nuts. The ASTM standard classification of austenite grain size in steels (E19) with two sets of charts; also the American Standards covering wrought steel and iron pipe (B36.10) and stainless steel pipe (B36.19) are a part of the book.

New specifications cover: seamless and welded steel pipe and tubes for low-temperature service; seamless ferritic alloy steel pipe for high-temperature service; forged or rolled carbon and alloy steel flanges, forged fittings, and valves and parts for low-temperature service; ferritic and austenitic steel castings for high-temperature service; ferritic steel castings for pressure—containing parts suitable for low-temperature service.

Numerous Emergency Alternate Provisions applying to specifications in this compilation have been issued and are furnished with this volume. (These Emergency Alternate Provisions are issued by the American Society for Testing Materials in accordance with a special procedure in the interest of expediting procurement or conservation of materials during the period of National Emergency. They are intended for use where they may be considered by the purchaser of the material as a permissible alternate for the specific application or use desired.)

This book is of service to those concerned with pressure piping, power generating, the petroleum field, the distribution of gas, oil, water, etc, and to individuals in every industry where these materials are important.

ASTM Standards on Copper and Copper Alloys. (American Society for Testing Materials, 1916 Race Street, Philadelphia 3, Pa. $4.75 per copy in heavy paper cover; $5.40, cloth cover.)

This latest edition (February 1952) brings together all of the ASTM standards pertaining to copper and copper-base alloy products developed by Committee B-5 on Copper and Copper Alloys, Cast and Wrought, and other ASTM technical committees.

The 114 specifications and test methods contained in the book cover plate, sheet, rolled bar and strip; rod, bar, and shapes; pipe and tubes; wire; sand and die castings; arc-welding electrodes and brazing solder; standard nominal diameters and cross-sectional areas of American Wire Gage (Awg) sizes of solid round wires used as electrical conductors; stranded conductors and other electrical usages of copper.

A group of specifications cover nonferrous metals such as slab zinc; pig lead; nickel; phosphor; silicon, and electrolytic cathode copper; and others.

Also included are test methods covering expansion, mercurous nitrate, resistivity, tension, micrographs, hardness, sampling, and grain size evaluations.

There are recommended practices for tension test specimens for copper-base alloys for sand castings and designating significant places in specified limiting values.

Illuminating Engineering Society's Lighting Handbook, Second Edition. (Illuminating Engineering Society, 1860 Broadway, New York 23, N.Y. $8.00)

This revised edition incorporates the newest developments in lighting techniques, application, and theory. The volume contains 657 photographs, detail sketches, and charts. The *Handbook's* 24-page index contains more than 4500 reference items.

Technical information contained in the *Handbook* is divided into 18 sections. These cover physics of light; light and vision; standards, nomenclature, abbreviations and symbols; measurement of light; color; light control, daylighting; light sources; lighting calculations; interior lighting; exterior lighting; sports lighting; street and highway illumination; aviation lighting; transportation lighting; miniature lamp applications; photographic, reproduction, projection, television and radar screen lighting; and miscellaneous applications of radiant energy. The 37-page appendix includes tables and calculations on conversion factors for lighting units; glare factors; nomogram for determining angle of incidence; specular and diffuse reflection factors of common papers and inks; and many other important data. American Standards on color and lighting are referred to throughout the book.

The Manufacturers' Reference Data Section furnishes technical information, specifications, and other data about lighting equipment.

Thirty-four technical committees prepared the revised edition. The Society of Motion Picture and Television Engineers; Society of Automotive Engineers; American Society of Heating and Ventilating Engineers; and National Electric Sign Association collaborated.

Recommend Government Save with Modular Method

For greater economy and conservation of materials, all Federal construction should be modular. This is the recommendation made to the Defense Production Administration by the Building Research Advisory Board of the National Academy of Sciences following a one-year study of conservation in building construction. William Scheick, Executive Director of the Board, reported the results of the study at the annual convention of the American Institute of Architects June 26. Eight advisory panels helped in making the survey and preparing the recommendations. Under the chairmanship of architect Ralph Walker, the ten-man Advisory Panel on Space and Planning reported:

"This Advisory Panel endorses as a conservation measure the principle of modular coordination on the 4-inch module, as developed by Committee A62 of the American Standards Association. The Panel recommends that modular coordination be adopted in Government practice and that it be required in any contract for the design of Government buildings."

The modular method was given attention in various ways at the AIA convention. A meeting of deans of U.S. architectural schools was shown a set of projection slides developed by the HHFA as an aid in teaching the principles of the modular method. HHFA Research Director Joseph Orendorff reported that the slides will be available this fall for use in demonstrating the benefits of the system to future architects.

An exhibit on the modular method was part of a show of joint activities of the American Institute of Architects and the Producers' Council. The exhibit included sample modular drawings and blown-up color photos of actual modular construction.

Other News About Modular Coordination—

The Navy is now bringing in recruits to the modular method, reports William Demarest, Jr, secretary of Sectional Committee A62 on Modular Coordination, and secretary for Modular Coordination of the American Institute of Architects. Mr Demarest reports in the May issue of *Modular Coordination Memo*:

"When the Bureau of Yards and Docks indicated that they wanted their new research building to be Modular, conservative Boston architects Anderson & Beckwith anxiously phoned your Secretary to find out just what this amounted to. Reassured by a few helpful hints and the loan of a sample set of Modular working drawings, the Beckwith office tackled its first Modular job under the guidance of Commander Harold Hauf, who is as vigorous a Modular-enthusiast in the Navy as he was when editing *Architectural Record*. That was last Fall so, when visiting Boston last month, I looked in on A & B to see how they were making out. I was shown an excellent set of Modular architectural working drawings and details—just as clear and simple as they should be—accompanied by Modular structural drawings. The two men who have the responsibility for this job then lectured me (as architects often do) on the many advantages of the Modular Method, emphasizing that this Modular building had required no extra drafting time. Since they had found the system helped greatly to clarify their thinking, they had resolved never to go back to un-coordinated dimensioning if this could be avoided.

"Come to think of it, I remember now that the Navy recruiting branch has always been the envy of the other Services!"

An *AIA Directory of Modular Products* is now in preparation. Requests for names of firms making modular-size building materials have already gone out to some producers' associations; more are on their way to associations and some companies. Manufacturers and their locations will be listed geographically or by products or both. As part of a handbook of practical hints on how to make use of the Modular Method, illustrated with reproductions of Modular drawings, the Modular Products Directory will be published for distribution to architects, builders, engineers, and their draftsmen.

ASTM—First Fifty Years

(Continued from page 246)

ment departments as well as delegates from other countries who had come to pay their respects to the Society. Dr R. E. Zimmerman, vice-president, United States Steel Company, and a past president of ASA, spoke on behalf of the American societies and groups. Dr Albert Caquot, president of the International Organization for Standardization, who was in the United States for the general assembly of ISO in New York, spoke for the groups from other countries.

T. S. Fuller, engineer in charge of Works Laboratory, General Electric Company, Schenectady, retiring president of the Society, called attention to "Some Gratifying Results" in his talk at the luncheon. After citing the the progress made by ASTM in its 50 years, he concluded by declaring that the most important problem facing the world today is the search for a means of providing mutual understanding among nations. "I appeal to engineers of all lands," he said, "because of their mutuality of interests, to work for understanding not only in the field of standardization but also in politics, economics, and all other fields, to the end that our hope that we may contribute our 'widow's mite' to a permanent peace may be nearer justification."

Dr Zimmerman commented, "To be useful, testing must be conducted in the spirit of discovering 'the truth, the whole truth, and nothing but the truth.' That same principle applies with equal force to the formulation of specifications and standards based upon the truth so revealed." "The creed of the ASTM embraces these ideas."

"Specifications and standards, as well as methods of testing," must keep abreast of progress," he declared. "Obsolescence and inadequacy are

ever present challenges which must be met and effectively handled in the field of the Society."

"The 'day of rest' for the American Society for Testing Materials is a mirage, not an attainable reality," he declared, "because, in a dynamic economy, new methods of manufacture, new raw materials, and new products are constantly appearing on the scene." "Then, too," he said, "an increasing population requires improved facilities, commensurate with its expanding needs."

Dr Caquot commented that methods of test are necessarily in a state of evolution. "Therefore," he said, "the groups assuming the task of directing test methods must always be open to progress. Men, dedicated to this work, are fully aware of the difficulties of their task which in endless succession comes to an end and is born again. The ASTM has shown in the first 50 years of its history that it is well up to its important role. All of us wish to ASTM, as well as to this great nation, the United States of America, a long period of prosperity."

No longer does Massachusetts law require the Registrar to give individual approval to the different types of safety glass used in motor vehicles. However, any automobile operating in Massachusetts must use safety glass conforming to the minimum requirements of American Standard Z26.1-1950 in partitions, doors, windows, and windshields. Test reports can be filed by manufacturers as proof of conformance.

American Safety Standards in Industry

More than 150 American Safety Standards that are helping in industry's crusade to cut industrial accidents are now listed and described in a new booklet just published by the American Standards Association.

A brief commentary on each standard tells what the standard covers and outlines the requirements or recommendations it contains. A comprehensive subject index, alphabetically arranged, makes it possible to locate any subject covered in any of the standards quickly and easily. In addition to approved American Safety Standards, the booklet also includes a listing of safety standards under development.

Nearly all of the approved standards are widely used in industry. Some have been adopted as a basic part of municipal, state, or federal regulations. The National Electrical Code, for example — an approved American Safety Standard sponsored by the National Fire Protection Association—has been used in whole or in part in the legal enactments of 716 municipalities. Similarly, the great majority of states that have rules on the design and construction of overhead electric power and communication lines use the National Electrical Safety Code, American Safety Standard C2, sponsored by the National Bureau of Standards.

These standards have grown out of the pooling of efforts in safety standards work of local, state, and federal agencies, insurance companies, labor groups, the National Safety Council, and manufacturers and users of safety equipment, within the procedures of the American Standards Association. As the pamphlet states, "The success of American Safety Standards is due in large part to the fact that they have always been developed by the people who know them best and use them most. The provisions included in the standards represent a crystallization of the accumulated wisdom of long industrial experience. They constitute a symposium of the best methods of meeting the technical problems of safety. Because of these factors, industry has voluntarily adopted the standards and used them widely."

"These same reasons," it goes on to state, "commend American Safety Standards to city and state boards and commissions, to insurance organizations, and to technical agencies."

The American Safety Standards program is being reviewed by the Safety Code Correlating Committee at the request of the Engineering Committee of the President's Conference on Industrial Safety. The standards are being studied to determine whether the work needs to be expanded.

Copies of the pamphlet, *American Safety Standards*, are available without charge from the American Standards Association.

How to Check Rayon

(*Continued from page* 243)

Committee L22. While this plan is not to be considered an American Standard, its recommendations are intended to serve as a guide to any organization that wishes to administer it.

Under the labeling plan, each fabric or garment would be labeled to indicate how it should be laundered or cleaned.

"Washable" means that an article may be washed at home or in a commercial laundry with any good soap or detergent in water not over 160 degrees F.

"Washable at Hand Temperature" means that the article may be washed by hand or machine at home or in a commercial laundry with suds of a mild (neutral) soap or detergent. It is particularly emphasized that the water used must not be more than 105 F.

"Dry cleanable" means that an article should not be washed but that it should be dry cleaned only.

The ASA Sectional Committee on Rayon Fabrics has stated that the success of such a certification plan hinges on the integrity, impartiality, and thoroughness of the certifying agency.

The sectional committee in charge of the labeling and certification project has created a subcommittee which will have charge of introduction of the standards to industry, commerce, and consumers.

News Briefs

• • **The National Board of Fire Underwriters** has named Everett W. Fowler, Scarsdale, N. Y., to serve as director of its newly created division of codes and standards.

The new division will correlate the work being done on NBFU's National Building Code, Suggested Fire Prevention Ordinance, Standards for the Installation of Automatic Sprinkler Systems, as well as its many other published standards.

Mr Fowler joined NBFU as a field engineer a few weeks after graduation from Worcester Polytechnic Institute in 1928. A year later he was assigned to engineering activities at NBFU's headquarters and in 1947 was promoted to assistant chief engineer.

Mr Fowler is an alternate member of ASA's Standards Council, a member of the Building Code and Construction Standards Correlating Committee, and chairman of the Sectional Committee on Building Code Requirements for Chimneys and Heating Appliances, A52. He is an associate member of the American Society of Civil Engineers, and is active on many committees of the National Fire Protection Association as well as other sectional committees under the procedure of the American Standards Association. He is also a member of the Joint Committee on Building Codes.

• • **A New Program of Research on Standardization**—A Fellowship for conducting systematic studies of standardization and its applications in science, engineering, production and marketing has been announced by Dr Edward R. Weidlein, President, Mellon Institute, Pittsburgh, Pa. This Fellowship will be sustained at the Institute by a grant from the Sarah Mellon Scaife Foundation of Pittsburgh, and its projects will be organized and supervised by Dr Dickson Reck, Advisory Fellow. Dr Reck will work in cooperation with research specialists of the Institute and with national authorities and societies.

Dr Reck is lecturer in business administration at the University of California. He holds a B.S. degree in industrial management from the University of Illinois, a Ph.D. degree in economics from Columbia University, and has taught economics and marketing at the University of Pennsylvania. He has had wide experience in the field of industrial administration and standardization. For ten years he was with the Square D Company, manufacturer of electrical equipment, in Detroit, Mich. In the early years of World War II Dr Reck was head of the Standards Division of OPA, and from 1944-1947 he was on detail from the Department of State to the Government of the Republic of China, by which he was appointed adviser on industrial organization and standardization. Later, from 1947 to 1950, the Department of Defense sent him to Japan to give attention to problems of technology and standardization. More recently he was engaged as an adviser to the American Standards Association on preparation of standards manuals in connection with government contracts. He is the author of a number of publications in the fields of marketing and industrial management.

• • **Standardization, modernization, specifications, and value analysis** are the subjects to be discussed at the Skytop Conference of the American Society of Mechanical Engineers October 27, 28, 29. The Conference offers executives an opportunity to take part in an informal, off the record discussion on management problems. Subject this year is "Leadership in Cost Improvement." Cyril Ainsworth, Technical Director of the American Standards Association, will participate in the discussion in connection with savings from standardization.

• • **Copies of "Industry's Last Chance"** are available. This is a speech given by Cyril Ainsworth, Technical Director, American Standards Association, on the problem of voluntary industrial safety versus the trend toward legislative action. The speech was presented at the annual meeting of the American Society of Mechanical Engineers last Fall.

• • **A new planbook of modestly-priced brick homes,** designed for the use of modular building materials, has been published by the Structural Clay Products Institute.

Plans for 45 homes, representing a cross-section of modern architectural styling, are included in the new book. Most are designed to be built for less than $15,000 in the average home building market.

The designs call for the new cavity wall construction, thus assuring maximum comfort and weather resistance, and permitting the use of beautiful exposed masonry interiors. The homes can be built of nonmodular materials as well as modular.

The planbook can be purchased from Structural Clay Products Institute, 1520 18th St., N.W., Washington, D. C.

• • **The thirty-fourth Annual Meeting** of the American Standards Association will be held at The Waldorf-Astoria, New York, Wednesday, November 19. The Howard Coonley Medal and the Standards Medal will be awarded at the Annual Meeting Luncheon, to be held in the Sert Room.

• • **Noteworthy strides in fire protection** and fire prevention have been reported by the National Board of Fire Underwriters in a review of its year's activities ending April 30.

According to an announcement made at NBFU's Annual Meeting May 22, the Committee on Fire Prevention and Engineering Standards has contributed much in this respect. It is one of 13 standing committees functioning within the framework of

NBFU's nation-wide public service organization of capital stock fire insurance companies.

Through its research, NBFU also renders member companies engineering service on many problems of a technically complex nature. Fire and explosion safety on special hazards is provided to industry and to such governmental agencies as the Atomic Energy Commission, the Department of Defense, the United States Coast Guard, and the Federal Civil Defense Administration.

Listed in first place among the committee's accomplishments were its published reports on 67 municipal surveys. The larger cities reported on were Jersey City, Newark, Galveston, Jacksonville, Buffalo, and Pittsburgh. Six of the reports were on cities not previously visited by NBFU engineers. One of those was Levittown, N. Y., a city that was not subject to growth and expansion over a period of years, but developed almost overnight.

Copies of NBFU engineering standards in various fields reached the million mark in circulation. Particular interest was expressed in fire safety standards for liquefied petroleum gas. "A steadily increasing use for this gas for a widening range of purposes has made necessary almost constant study in order to develop suitable safeguards for the industry's growth," the report stated, pointing to the disastrous fire and explosion at the propane terminal of the Warren Petroleum Company at Port Newark, N. J., last July, as an example of this situation.

Another development which received attention is the increasing practice of gas utilities to provide large storages of liquefied petroleum gas in order to meet standby peak load requirements.

The committee reported further that 351 cities and one state (Kentucky) have adopted NBFU's "Suggested Fire Prevention Ordinance". This is a net increase of 52 since the last report published.

The committee's report noted that its hospital inspection program has been completed and hospital and public safety officials have emphasized its value.

William J. Serrill, 1862-1952 —Word has been received by the American Standards Association of the death on May 27 of its first president, William J. Serrill. Mr. Serrill took office in 1928 at the time the American Engineering Standards Committee was reorganized into the more widely representative and effective American Standards Association. He served until December, 1930.

Mr. Serrill was born in Darby, Pennsylvania, November 10, 1862 and was graduated from the University of Pennsylvania in the Class of 1883. He became an employee of the United Gas Improvement Corporation in 1885 and remained with that organization until his retirement in 1929.